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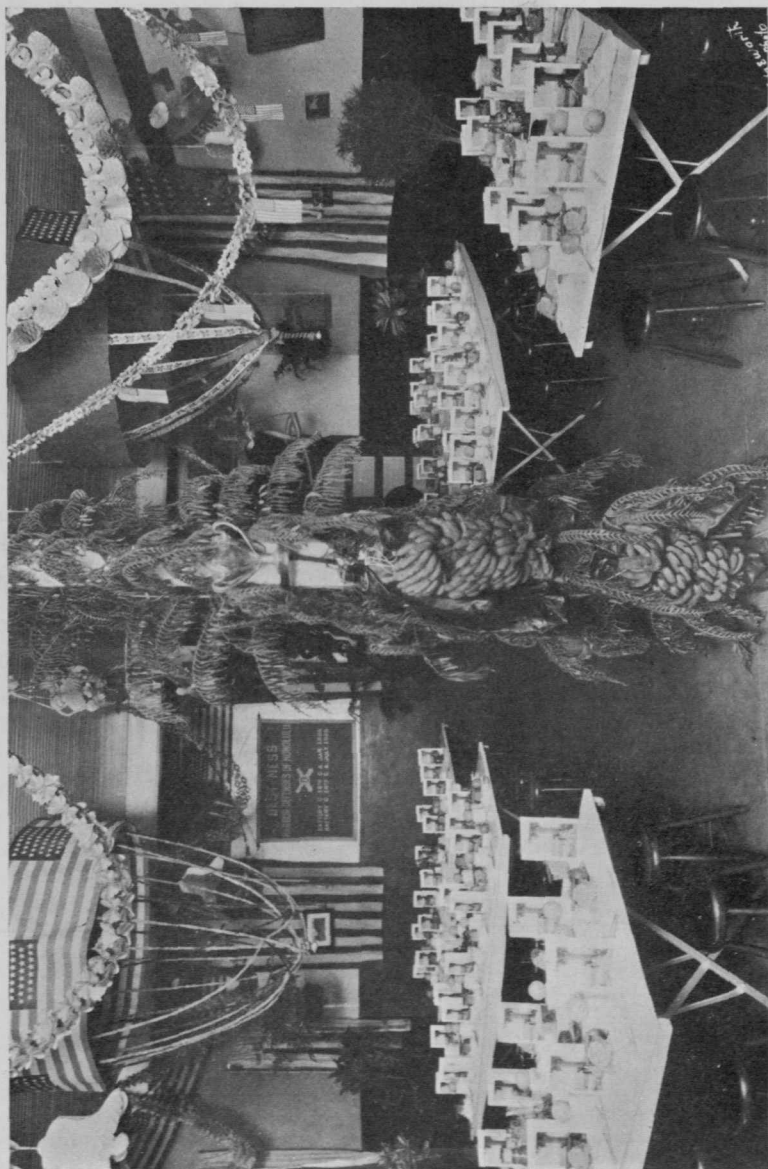
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A MESS ROOM IN HAWAII
Battery C, 16th C. A.

With the exception of the bananas, flags, and bunting, the decorations—hanging baskets, varied colored croton plants, etc., are normal. The tables are lacquered white and the stools green. The white and green color scheme is carried out and the result is a transformation of a mess hall into a dining room.

THE COAST ARTILLERY JOURNAL

Volume 70

June, 1929

Number 6

Antiaircraft Defense Tactics With a Mechanized Force

By CAPTAIN LUCAS E. SCHOONMAKER, C. A. C.

PURPOSE OF THE ARTICLE

THE purpose of this article is to discuss the employment of antiaircraft artillery with a mechanized force. In order to visualize the problems which confront the antiaircraft artillery when operating with such a force, a brief description of the composition of the force will be given, together with a general outline of the tactical employment of the force itself. By examining a few of the dispositions of the force, its vulnerability to air attack will be disclosed. Then by a study of the principles of gun and machine-gun defense and the characteristics of the new types of antiaircraft weapons, an endeavor will be made to show the type of antiaircraft defense which is best suited for the protection of a mechanized force.

DESCRIPTION OF A MECHANIZED FORCE

A mechanized force is a unit equipped with the latest mechanical developments in weapons, armor protection, and self-propelled fighting vehicles, suitable for rapid movement across country and on the battlefield. Its development was due to a desire to restore to modern warfare something which had been lost in the last war—mobility.

As now constituted, tanks are considered the principal attack elements of the force. Other arms are included as auxiliaries to furnish the elements of holding power, security, fire support, and facility of movement and supply. As the force is still in its experimental stage, its most economical size and the exact proportion of the various arms which constitute it, as well as their equipment, are still matters of speculation and are beyond the scope of this article. It is sufficient to state that a mechanized force of the future will probably be made up of the following units:

- a. *Light tanks*, and probably medium tanks. The former may be carried on large trucks on the road, or they may run under their own power at all times.
- b. *Armored cars*, mounting machine guns and one pounders, for security and reconnaissance. These are at present operated by the Cavalry.
- c. *Infantry*, mounted in trucks or, possibly, in cargo carriers with track laying elements, to furnish the holding power which tanks lack.

d. Machine guns carried on light, cross-country trucks, such as the six-wheeled Chevrolet $\frac{3}{4}$ -ton truck developed by the Ordnance Department.

e. Artillery to furnish fire support. At present the 75-mm. tractor-drawn guns are used. These are portéed on trucks on the road. Possibly a larger gun with greater range may be included.

f. Chemical Warfare troops, to furnish gas and smoke clouds, as well as gas protective apparatus.

g. Engineer troops, to facilitate movement by strengthening and repairing bridges, repairing roads, etc.

h. Signal troops, for communications.

i. An antiaircraft unit, the composition of which will be discussed in this article.

j. Supply elements for ammunition, rations, and gasoline.

k. Repair units, ordnance and quartermaster.

l. Medical unit.

m. Possibly an *Air Corps* unit.

The bulk of the troops composing the force will be tanks, infantry, and artillery; the other units will only be present as small bodies of specialized troops. Some idea of the size of the force can be gathered from the fact that in 1928 the force comprised about 250 motor vehicles and occupied a road space of 8 miles. It is expected that in future the force will consist of about 500 motor vehicles.

GENERAL EMPLOYMENT OF THE FORCE

The role of the mechanized force is essentially offensive. Surprise, speed, and depth of penetration in the attack characterize its operations. The tactics of the force as a whole are based upon supporting and assisting the attack of the tank elements and upon exploiting the successes gained in the tank attack.

As constituted at present, the mechanized force can travel 100 miles a day without difficulty. Road speeds of 10 miles an hour have been made with heavy trucks, and speeds as high as 25 miles an hour with light trucks. It is expected, when new equipment becomes available, that the force will be able to travel across country with as much ease as it now travels upon roads. The first problem which confronts the antiaircraft artillery is then one of mobility; the antiaircraft guns must be able to move with the force wherever it goes. This, as will be pointed out later, has been successfully solved with the latest types of equipment.

By reason of the great force and striking power of a mechanized force, it is certain to be a tempting target for a hostile aerial activity, and its destruction or what is also of great importance, its temporary immobilization, will be attempted without delay.

For the purpose of discussing antiaircraft defense tactics, the operations of the force may be roughly classified under three heads:

a. Marches on the road or across country in the presence of the enemy.

b. Halts in bivouac, either by day or by night.

c. Attack formations, including approach formations to the attack.

This classification is made because under different formations the force presents a different type of target and exhibits a varying degree of vulnerability to air attack.

a. Marches on the road.

In this formation the force may travel in a long column or in several columns on parallel roads, or it may move in detachments using the same road at different times. At any rate, the target presented is a long, rapidly moving narrow one. This is not a very favorable bombing target from high altitudes; hence we can conclude that the most likely form of air attack to be expected will be made by planes swooping down at low altitude over the column and either attacking it with machine guns or dropping gas and smoke on it. Such an attack could be executed with great rapidity and would materially retard the progress of the column, due to the confusion which would inevitably result on account of casualties among the drivers and damage to the trucks from punctured tires and radiator leaks.

b. Halts in bivouac.

There are bound to be times when the force will be halted in bivouac. The force may march by night and remain concealed by day, or it may be necessary to remain several days and nights concealed in one locality for tactical reasons. At this time, the force is spread out over an area and offers a tempting bombing target. Its protection in this situation is of paramount importance, as a few well-placed bombs might rob it of a great part of its strength.

c. During the attack.

The formation which the force adopts during the attack depends on various conditions such as the nature of the terrain, the amount of frontage covered, the position occupied by the enemy, whether it is to be a flank attack, whether the enemy is strongly entrenched or not, and so forth. In general, however, the following may be considered as the various phases which are successively passed through by the force when making an attack.

The force is approaching from a distance in column formation. When nearing the battlefield, it begins to deploy for its approach march. Various units may use different routes to get to the positions assigned. The light tanks, if carried on trucks, are detrucked. The 75-mm. guns are taken off their trucks and are dragged forward behind their tractors. The infantry detruck. Although these operations are completed very swiftly, and may in fact be finished within an hour, during this preparatory stage the units, being spread out, are liable to bombing attack.

When the attack actually begins, the tanks advance in waves, supported by artillery fire on the hostile position and smoke clouds to blind the enemy,

followed by the infantry for mopping up and holding the ground gained. During this period the enemy planes will attack both by bombing and by swooping over the troops. This low-swooping attack over the advancing waves of tanks and infantrymen is believed to be the one which will be the most necessary to combat.

At the conclusion of the attack, while the ground gained is being consolidated and the force, which necessarily has become scattered, is being assembled, it is again a target for bombing attack.

ANTIAIRCRAFT DEFENSE TACTICS

Having shown the vulnerability of the mechanized force to air attack, let us examine the principles of antiaircraft defense and the characteristics of the latest antiaircraft weapons to see just what protection can be given to the force by each weapon.

The primary mission of antiaircraft artillery is to furnish an adequate local defense of our ground forces and establishments against hostile aerial activity. In the case of the mechanized force, we are faced with the problem of a large ground force which shifts rapidly from place to place, at times across country, at a considerable rate of speed. This force must have protection both when stationary and when moving. It is obvious that antiaircraft units to be of any value in such a force must possess the following characteristics:

- a. Cross-country ability.
- b. Speed.
- c. Ease of changing from travelling position to firing position and vice versa.
- d. Rapidity of engaging targets.
- e. Fire power.

Let us examine the following weapons and see if they possess the above characteristics:

- a. The 3-inch A. A. mobile gun M-1.
- b. The 37-mm. mobile gun.
- c. The .50-caliber machine gun.

a. *The 3-inch M-1 Mobile Gun.*

The 3-inch M-1 mobile gun is a trailer mount weighing about $8\frac{1}{2}$ tons. It is equipped with pneumatic balloon tires of large size (40"x 9") which, on account of the low ground pressure per square inch, enable it to be moved across country with considerable ease. For a prime mover the 5-ton 4-wheel-drive Coleman truck or, as it is also called, 4-wheeled tractor is used. This vehicle is also equipped with large pneumatic tires (42"x 9") which enable it to negotiate rough and soft terrain. An interesting feature of the truck is an auxiliary transmission which, when engaged, multiplies all gear ratios by 3.3, thereby giving a very high reduction in low gear (139 to 1).

Field tests of the M-1 gun towed by the Coleman truck have shown that a

speed of 25 miles an hour can be maintained on level roads, that the truck will pull the gun up any hill which the force as a whole can negotiate, and that the gun can be pulled across country through sand, mud, and ditches far from roads. This unit, therefore, fulfills the first two requirements, cross-country ability and speed. If it were desired to increase the speed of the mechanized force, the speed of the gun could be increased by using as a prime mover the Coleman 7½-ton truck, a model with a larger motor, which has appeared during the past summer. The only minor objection which can be raised against the mobility of the gun is that its weight may necessitate strengthening bridges on unimproved roads.

The M-1 gun can easily be changed from travelling position to firing position; a trained crew can complete the operation in 13 to 20 minutes. At first sight, this appears a longer time than was taken by the old M-1918 trailer gun, which could be placed in firing position in 4 to 6 minutes. However, it must be remembered that the M-1 gun can be emplaced in positions where the 1918 gun cannot go and that much time was wasted uncoupling the old gun on the road, unloading the tractor, and pulling the gun into the position desired, before it was changed from traveling to firing position.

The M-1 gun has a muzzle velocity of 2600 f. s., a maximum vertical range of 10,000 yards, and a horizontal range of 15,000 yards. Its primary objective is bombardment aviation, its purpose being to break up or destroy bombing formations before they come within effective striking distance of their objective. The ceiling of loaded bombing planes, equipped with superchargers, is at present below the effective fire of 3-inch antiaircraft guns (Martin bomber, 8000 feet; Curtis N. B. S. 4, 10,000 feet—Monteith Aero-dynamics). With modern fire-control instruments, stereoscopic height finders, and Vickers or similar data computers, the data can be computed as soon as the plane is spotted. Fire with four guns can be opened as soon as the target comes within range. With a rate of fire of 88 rounds per battery per minute and with a time of flight of 10 seconds, there would be 14 shots in the air before the first one burst or, in other words, before the pilot was aware that he was under fire. The average accuracy of the 3-inch antiaircraft gun is about 9 per cent, or, roughly, one hit in 11 shots, so that the chances of securing a hit in the first few seconds of fire are favorable.

It is believed that the gun possesses the necessary fire power for use with the mechanized force and that targets can be rapidly engaged, provided the gun is already in firing position at the time the target appears.

The gun is also employed to attack observation planes with the object of making their mission as difficult as possible by driving them off, by forcing them to fly at high altitudes, or by forcing them to maneuver to avoid being hit.

b. The 37-mm. Automatic Gun.

The 37-mm. gun on mobile mount is fully as mobile as the 3-inch gun and, on account of being lighter, will probably travel faster on the road. It can be

easily placed in firing position, the operation taking less time than that for the 3-inch gun.

The gun has a maximum vertical range of about 4000 yards and a maximum horizontal range of 7000 yards. Its rate of fire is between 80 and 90 shots a minute. It fires a shell provided with a percussion fuze, sufficiently sensitive to produce detonation on contact with airplane fabric. A hit on any part of the plane will cause material damage. The fuze is provided with a fixed time element, which detonates the shell in the air, thus making the weapon safe for use over friendly territory.

The 37-mm. gun possesses one advantage over the 3-inch gun. Due to the rapidity with which it can be shifted from one target to another, within its effective range, it is capable of firing on entire formations in a brief interval of time. It is therefore a most efficient weapon for employment against attack aviation at lower altitudes. Due to its shorter range, it cannot replace the 3-inch gun but supplements it by furnishing effective defense against aerial attacks which the heavier caliber has been unable to break up.

c. The .50-Caliber Machine Gun.

The .50-caliber machine gun, with its present ammunition, has an effective range of about 2000 yards. It fires about 450 shots a minute. In order to be effective the bullet must hit a vital spot in the target. The platoon of four guns is the normal fire unit, but it is possible that the four-gun multiple mount may be used instead, as there is less dispersion when firing from this mount than from the tripod. The present average accuracy throughout the field of fire is approximately one per cent. With a rate of fire of 1600 shots per platoon per minute, this gives an expectancy of 16 hits per platoon per minute, or one hit each 3.75 seconds.

The four-gun multiple mount can be made mobile by mounting it on a light trailer, which would make it suitable for use with the mechanized force. The entire mount might also be placed in the body of a truck. The quadruple mount can be fired from the trailer or from a truck body and is therefore ready to engage targets the moment they appear over the column. For short ranges the fire is guided by tracer but for the longer ranges data computers are being developed.

PROTECTION OF THE MECHANIZED FORCE

a. The Moving Column.

The normal method of covering moving forces by antiaircraft gun fire is by the occupation of successive positions along the line of march. This requires more than one battery and also pre-supposes that the antiaircraft battery can travel faster than the column. With a rapidly moving column, such as the mechanized force, this is out of the question, and the only gun defense which could be provided would consist of defense of the starting point or the point of

arrival or possibly the defense of some particular sensitive point along the line of march, such as a bridge.

It has been stated that the aerial attack to which the moving-column is most likely to be subjected is that made by planes which suddenly appear, swoop down at low altitude over the column, and disappear again. Such fleeting targets cannot be engaged by 3-inch guns nor at such close range by 37-mm. guns. The .50-caliber machine gun, due to the speed with which it can be brought to bear on rapidly moving, short-range targets, is the ideal weapon for work of this sort. Quadruple mounts on a light trailer, placed at least one per mile of column, would provide a reasonable defense. Special circumstances might make it advisable to place machine gun units at or near the head of the column, with the mission of covering defiles until the column has cleared them.

We then conclude that the principal weapon for the defense of the moving column is the .50-caliber machine gun.

b. Defense of the Bivouac Area.

As has been pointed out, the force in bivouac presents a bombing target, since it is scattered over an area. In the defense of such a position, the 3-inch antiaircraft gun battery is supreme. The 37-mm. gun can be used as well, but it is not as effective, since the bombing planes can fly near the limit of its maximum vertical range, which is beyond its effective range. The 37-mm. gun can be used, however, as a supplementary defense.

The protection of the mechanized force from bombing attack when in bivouac is of such importance that it is believed that this one fact warrants the inclusion of a gun battery in the force. Of course, a platoon of searchlights with two sound locators would have to be included for night operations.

c. During the Attack.

During the attack, the force is subject to all forms of hostile aerial activity. It is believed that the gun batteries 3-inch and 37-mm. should precede the force and go into position first to cover the deployment of the force and to drive off any enemy reconnaissance planes. The machine guns, which would arrive scattered through the main column, could either be left for the protection of various units or could be placed in position near the line of departure to open fire on the planes which will swoop down over the advancing waves of tanks and infantrymen. These guns, being mobile, could be moved forward as the attack progressed.

d. Emergency Use of Antiaircraft Weapons.

While the destruction of hostile aircraft is the primary mission of antiaircraft artillery, if opportune terrestrial targets are present, all classes of anti-aircraft weapons can be used with effect against ground targets. It is not the

purpose of this article to advocate a hybrid gun, used equally against ground and air targets, but it must be remembered that the mechanized force is an unit acting alone and in emergencies must use the resources which are immediately at hand. Having the 3-inch gun, the 37-mm. gun, and the .50-caliber machine gun, there is no reason why, in special cases, full advantage should not be taken of their capabilities.

The most conspicuous example of such a case is the use of the 37-mm. automatic gun against tanks. The ordinary battery of field guns is helpless against a tank attack on the flank of the battery line. An effective antitank gun must have all-around fire and rapid traverse and elevation. Antiaircraft guns possess these qualities. It would be foolish not to make use of them should occasion arise.

Another case, which is probably extreme but which might arise, is the desirability of bringing the enemy under fire while still out of range of the ordinary 75-mm. field piece. Unless a piece of artillery heavier than the 75-mm. field gun is included for this purpose, the 3-inch antiaircraft gun, the horizontal range of which far exceeds the 75-mm. gun, could be used if equipped with proper range scales and special ammunition.

COMPOSITION OF ANTI-AIRCRAFT UNIT IN MECHANIZED FORCE

When the mechanized force is on the march, the 3-inch antiaircraft gun is of practically no use whatever, since the gun must first go into position before it can fire. The same is true of the 37-mm. gun. On the other hand, unless the 3-inch gun is present for the defense of the bivouac area, the force is likely to be wiped out or seriously damaged. It is believed that a battery of 3-inch guns should be included in a mechanized force for this defense. A 37-mm. gun battery is not a necessity, but makes a very desirable supplementary defense.

For the defense of the moving column, antiaircraft machine guns are a necessity. The only question which arises is whether these guns should be distributed to the various units to allow them to maintain their own defense or whether these guns should be grouped together as an independent unit. From an administrative standpoint, such questions as maintenance and ammunition supply would be better handled if the machine guns were controlled as a unit. From a tactical standpoint, the operation of the defense would be better, since the training of the men would be more uniform and the disposition of the guns throughout the column would be controlled by one head. The commander of the antiaircraft unit should be the antiaircraft defense commander of the mechanized force and should be responsible at all times for the disposition of the guns, machine guns, and searchlights of the antiaircraft defense.

SUGGESTED ORGANIZATION OF ANTI-AIRCRAFT UNIT FOR MECHANIZED FORCE

The following is merely a suggested organization for the antiaircraft unit of a mechanized force of about 400 vehicles, which would occupy a road space of about 12 miles. All cargo and towing trucks of whatever size for this unit

would be Coleman 4-wheel pneumatic-tired trucks, which have high road speed and good cross-country ability under full load. The Coleman 3-ton truck is chosen as the prime mover of the 37-mm. gun. It is believed that this will prove satisfactory. The 3-ton truck is also chosen for the prime mover of the light trailer carrying the .50-caliber quadruple mount. The 1½-ton truck would undoubtedly be satisfactory for towing, but the 3-ton truck allows more room for the range instruments and ammunition.

The term cross-country towing car is used. This refers to a stock model touring car, with a truck transmission and oversize balloon tires. Such a car is cheaper to produce than the car with the special cross-country body, does not weigh materially more, and has the same mobility, provided the top can be folded back when passing under low hanging branches. It also gives protection to the occupants from rain and sun and is more comfortable to ride in.

It is not known at this time whether it is contemplated to have an ammunition train in the mechanized force which would supply all ammunition for the force, including anti-aircraft ammunition. For this reason spare ammunition trucks are included.

One tractor is included in the gun battery for use in emergencies, such as pulling out stalled trucks in swampy ground. This should be a caterpillar 30, a tractor which weighs the same as the 5-ton Holt tractor and is half again as strong.

The motorcycles included are cross-country Harley-Davidsons with balloon tires, which were tested during 1928.

1. Searchlight Section.
 - 4 Searchlights on Cadillac trucks.
 - 2 Trucks with sound locator.
 - 2 5-ton trucks for rations, baggage, and spare parts.
 - 1 Cross-country touring car.
2. Machine-Gun Section.
 - 12 3-ton trucks with quadruple-mount .50-cal. machine guns on trailers.
 - 6 3-ton trucks, spare ammunition.
 - 4 3-ton trucks, rations and baggage.
 - 1 Cross-country touring car.
3. Gun Section.
 - 10 5-ton Coleman trucks (4 to pull gun trailers, 1 for instruments, 2 for spare ammunition, 2 for rations and baggage, 1 to pull tractor).
 - 1 Cross-country touring car.
4. 37-mm. Gun Section.
 - 10 3-ton trucks (4 to pull gun trailers, 1 for instruments, 2 for spare ammunition, 3 for rations and baggage).
 - 1 Cross-country touring car.
5. Maintenance Section.
 - 2 1½-ton light repair trucks.

- 2 Tank trucks.
- 2 Kitchen trailers.
- 2 Water trailers.
- 2 Cross-country motorcycles.

CONCLUSIONS

1. The mechanized force, by reason of its value, is sure to be a target for hostile aerial activity.

2. When on the march, the mechanized force is liable to attack by low-flying planes swooping over the column and should be defended by .50-caliber, quadruple-mount machine guns on mobile mounts.

3. When in bivouac area, the mechanized force is vulnerable to bombing attack from high altitudes and should be defended by 3-inch antiaircraft guns; 37-mm. guns would make a very desirable supplementary defense.

4. On the battlefield, antiaircraft guns and machine guns can afford protection against both bombing and low-flying targets, and can also engage land targets in emergencies.

5. An effective antiaircraft unit in a mechanized force should include searchlights, 3-inch guns, 37-mm. guns, and .50-caliber machine guns, and should be placed under an antiaircraft defense commander for the force.

6. The primary mission of the antiaircraft artillery with the mechanized force should be to protect it from hostile aerial activity at all times, to guard it from casualties from the air, both when the force is stationary and moving, and to enable it to arrive unmolested to accomplish its mission on the battlefield.

The individual is taught the principles of our government, and the obligations and duties of citizenship. I would that every young man might have these advantages, and believe that in no other way may the foreign boy so quickly learn Americanism.—Gen. John J. Pershing.

The Army Mine Planter Service

By CAPTAIN H. F. E. BULTMAN, C. A. C.

THE Act of Congress of February 2, 1901, which authorized the organization of the Artillery Corps with a chief, assigned as one of the duties of this new corps the development, installation, and operation of submarine mines for the defense of harbors. Prior to this time, submarine mining was a duty of the Corps of Engineers. Shortly after the organization of the Artillery Corps, the School of Submarine Defense was established and the Torpedo Board was constituted. Both of these were concerned with the development and installation of submarine mines and in carrying on this work they soon discovered the need for specially built and equipped vessels with trained personnel for mine planting.

Through the energy and foresight of General Randolph, Chief of Artillery, and Major Murray, then Commandant of the School of Submarine Defense, authority and funds were obtained in 1903 for the construction of four vessels to be specially designed, built, and equipped for mine planting. These vessels, which were constructed in accordance with designs furnished by the Torpedo Board, were completed and put in service in 1904. One of these was assigned to the School of Submarine Defense at Fort Totten, New York, for exclusive use there for submarine mine instruction and experimentation. The other three mine planters were used to give instruction in planting and maintenance of submarine mines in the different Artillery Districts along the Atlantic and Gulf Coasts.

The need for planters for the Pacific Coast and the foreign possessions was soon recognized but nothing was accomplished in this matter until General Murray became Chief of Artillery. He, who was probably the best informed officer at that time on submarine mining, stated that experience had shown that mine planting could be done efficiently and successfully only by having vessels specially fitted and crews specially trained and practiced in mine-planting operations. Recognizing, however, that authority and funds could never be obtained to have sufficient mine planters to plant all projects immediately upon declaration of war as would be necessary in order to protect our harbors, General Murray began to look for suitable vessels that could be obtained to supplement the mine planter service. In the summer of 1907, arrangements were made to supplement the mine planter service with the vessels of the Lighthouse Service when these were turned over to the control of the Navy at the beginning of war. All equipment necessary to make these vessels suitable for mine planting was purchased and stored in places convenient to the location of each lighthouse tender where it is readily available. These vessels are to be used for the initial planting only, the maintenance to be done by the regular planters.

The necessity of having more mine planters was still very evident and authority and funds for four more were obtained. These four were similar in

construction to the first four built. They were completed in 1909 at a cost of \$175,000 each. This made a total of eight vessels in the mine planter service in 1909. The four new planters were kept for service on the Atlantic and Gulf Coasts and the four older ones were sent to the new stations, two going to the Pacific Coast by way of the Straits of Magellan and two to the Philippine Islands by way of the Suez Canal.

There was no increase in this service again until 1917 when the *Graham* was built and put in commission. In 1918, two cable ships were taken over from the Signal Corps and added to the mine planter service. The big increase came through within the next two years when nine additional planters were authorized and built at a cost of about \$750,000 each. These were completed during the fall of 1920 and brought the total at that time up to twenty vessels.

All of these vessels were kept in commission until 1922, although there was comparatively little activity connected with submarine mining for them to engage in. With the reduction of the Army in 1922, the mine planter service was dealt its hardest blow. The number of planters was reduced from twenty to eight in commission and one in reserve. The eleven surplus vessels were disposed of in various ways. Several were sold to commercial concerns, some were turned over to the Lighthouse Service and remodeled for use as lighthouse tenders, and one was turned over to the Coast Guard for use as a cable ship.

There has been no change in the vessels in service since 1922 and the eight now in commission are the *Armistead*, built in 1904 and now assigned to the Harbor Defenses of San Francisco; *Ord* and *Schofield*, built in 1909 and assigned to the Harbor Defenses of Sandy Hook and Chesapeake Bay, respectively; *Graham*, built in 1917 and assigned to the Harbor Defenses of Cristobal; and the *Baird*, *Bell*, and *Harrison*, built in 1920 and assigned to the Harbor Defenses of Long Island Sound, Puget Sound, and Manila and Subic Bay, respectively. The *Henry*, which was taken over from the Signal Corps, while assigned to the Harbor Defenses of Sandy Hook, is detailed on signal cable duty and works whenever needed.

When the mine planter service was started in 1904, the personnel of each planter consisted of the commanding officer who was an artillery officer, assigned by the War Department, a detail of Artillery Corps enlisted men, and the crew of the vessel consisting of deck and engine department personnel, who were civilians. The commanding officer was in charge of the vessel and all personnel, the command of the civilian crew being exercised through the master. The Artillery Officer was also the Finance Officer, Supply Officer, Personnel Officer, and Officer charged with supervising mine planting and instructing the personnel of the mine commands during the time the planter was at a coast defense for submarine mine work.

The enlisted detachment had charge of and operated the mine-planting gear on the planter. They were under the direct command of the commanding officer for all purposes. The civilian crew operated the vessel and were under the direct control of the civilian master. There was no change in the status of any of this personnel from the time of the organization of the service to 1918.

Because of the fact that the mine planters are essentially a military unit and frequently engaged in work of a confidential nature and since the civilian crews had never proved entirely satisfactory, the Chief of Coast Artillery recommended in 1916 that legislation be passed authorizing the militarizing of the crews of these vessels. This was done in 1918 and was a most beneficial change. At that time, a spécial classification designated as Warrant Officers, Army Mine Planter Service, was organized with an authorized strength of one hundred. These warrant officers were divided into five grades: masters, first mates, second mates, chief engineers, and assistant engineers. This classification corresponded to the warrant officers authorized and needed for each planter, and the number authorized provided for five warrant officers each for the twenty mine planters which were then in service or being prepared for service. The personnel for this service came from the civilian crews of the mine planters, who were given an opportunity to come into it as warrant officers in the grades corresponding to those which they then held as civilians, from civilians who passed the required examinations, and later from graduates of the Nautical School which was conducted at Fort Monroe, Virginia. The other members of the crews, other than the warrant officers, were obtained from the enlisted men of the Coast Artillery Corps.

The number of Warrant Officers, Army Mine Planter Service, which was authorized remained at 100 until 1922 when, with the reduction of mine planters in active service from twenty to eight, the number of warrant officers authorized was reduced to forty to correspond with the number needed for the planters kept in commission. At that time, all warrant officers in all grades in excess of the forty authorized were completely discharged from the service without being granted any allowance or considerations of any kind. This was soon recognized throughout the service as a great injustice to these men, many of whom had years of service in various other service capacities and finally, after about four years of waiting, Congress passed an Act giving them the same corresponding compensations that had been given the officers who had been discharged when the size of the Army was reduced in 1922.

That the change from a civilian crew to a military crew was a great step forward should be very plainly evident to anyone who has had the opportunity to compare the services rendered by the mine planters today with that rendered by the other vessels of the Army with which Coast Artillery personnel have to deal.

Mine planters are performing willingly, efficiently, and satisfactorily every conceivable kind of service whenever and wherever requested. A large part of the credit for this is due to the warrant officers, who are really the "Backbone" of the service. These men are the equals professionally of the civilians who hold similar positions on the other Army vessels and the extension of a similar service to include the crews of all vessels operated by the Army would undoubtedly prove of as much benefit to these as it has proved to the mine planter service.

The crews of the mine planters now consist of one commissioned officer, five warrant officers, and twenty-one or twenty-four enlisted men. These are all

assigned by the Harbor Defense Commander under whom the vessel operates. The three additional men are allowed for the vessels burning coal. In line with reductions throughout the Coast Artillery, the size of the crews of mine planters has been reduced until it has reached its present size. That such a crew is entirely too small for such a vessel can be seen by comparison with the crew of one of the smaller planters which was turned over to the Coast Guard. This vessel which was formerly the U. S. A. M. P. *Mills*, now the C. G. *Pequot*, is now performing duties quite similar to those performed by mine planters. The *Pequot* has a crew of 44 men, none of whom are paid less than \$30.00 a month. The mine planter located at the same place has a crew of 21 men, over half of whom are privates, whose pay is \$21.00 per month. That the planters are performing so satisfactorily under such conditions should be ample proof of the satisfaction of service crews for the Army Mine Planter Service.

When the Mine Planter Service was first organized in 1904, the development of submarine mining was occupying a considerable portion of the efforts of the Artillery Corps. The destruction to navy vessels wrought by the mine fields at Port Arthur, Dalney, and Vladivostok during the Russo-Japanese War served to center the army's attention on the importance of this method of defense. This interest in submarine mining was kept up for many years. That faith in submarine mining as a powerful means of defense was still great at the beginning of the World War can be seen from the fact that mine commands throughout the service were kept intact for a long time after the other Coast Artillery organizations had been broken up to form new units. During all this period, mine planters operated under the direction of the Chief of Coast Artillery and performed mine work exclusively.

The interest in submarine mining was beginning to wane however and by the end of the World War these mines were receiving very little of the time of the Coast Artillery.

About this time, the mine planters were assigned to Coast Defenses and were made available for any kind of artillery work. This continued until 1924 when a change in the regulations governing the mine planter service made the planters available for *any* kind of duty when they were not needed for artillery work. Since then, they have been used for almost every conceivable purpose. In most cases, especially when the demand for vessel service is great, the planters have been made available for artillery and mine work only when some other activity of the Harbor Defense did not have use for them.

The decline in submarine mine work has been noticed by the Office of the Chief of Coast Artillery and orders were issued this year stressing the importance of again taking up this work in earnest and requiring the planting of full groups of nineteen mines instead of the haphazard planting of small fractions of these groups that has characterized most of the practices of the last five years.

It is to be hoped that with a renewal of interest in submarine mining, the mine planters will again be released to the duty for which they were originally authorized and will be able to develop that efficiency and spirit of which they are capable if given a chance.

Converting the SCR-67-A

By STAFF SERGEANT J. C. WADDELL, 59th C. A.

AT the present time throughout the various army posts of the United States, there are a great number of the radio telephone equipments SCR-67-A. This apparatus, already obsolete, is for the greater part unserviceable. However the set box BC-13-A, a component of this equipment, contains some excellent apparatus which deserves something better than to end in the salvage. For those who care to do so, these unserviceable sets offer a splendid opportunity for a little radio construction and engineering.

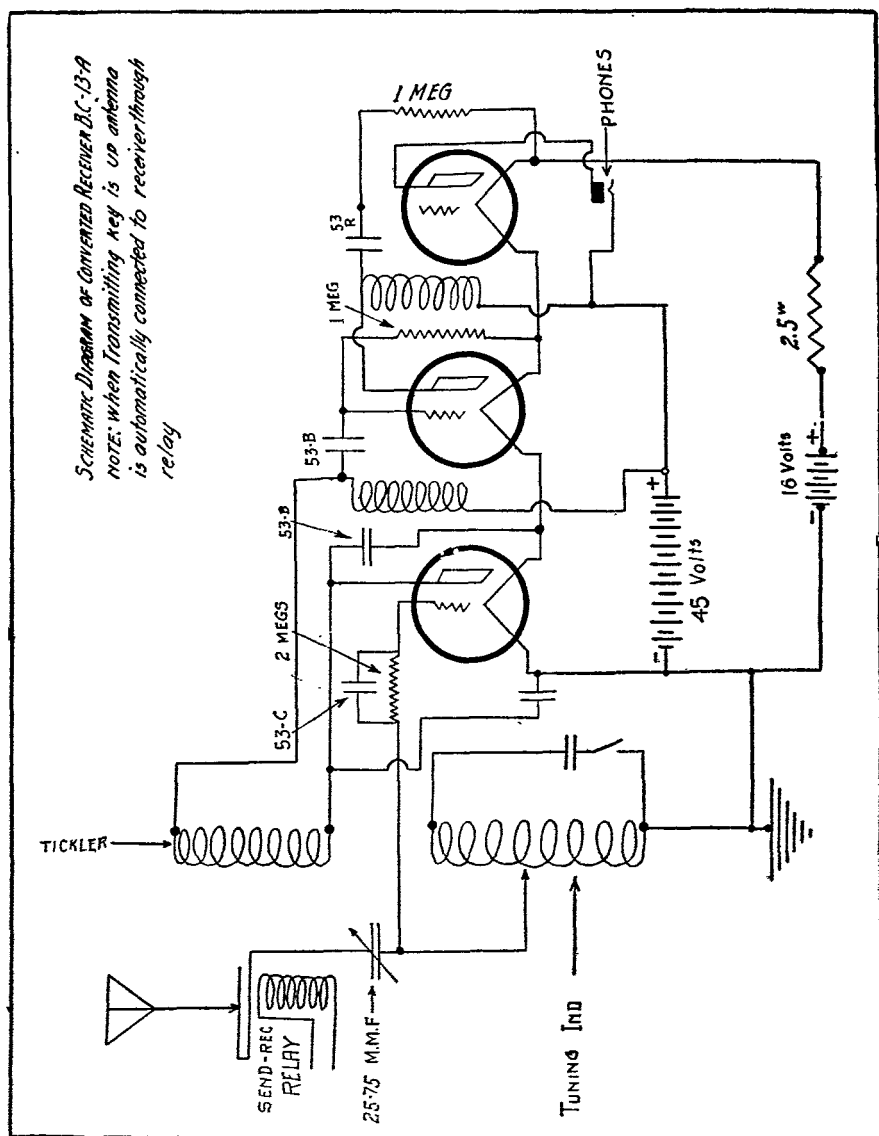
At Fort Mills four of these equipments were on hand and three of them were unserviceable. These sets could not very well be spared so it was thought advisable to make an attempt at converting them into useful apparatus. Authority was obtained for the conversion of two of the equipments as a starter and the work has been completed. In view of the good results obtained it is thought that a description of these sets, as well as the manner of converting them, may be of interest to others who would care to undertake some of this work for themselves.

The completed set is a ten-watt C. W. transmitter and radio telephone combined and incorporated on the same panel with a three-tube regenerative receiver. The transmitter occupies the upper part of the panel and the receiver the lower. The transmitting wave is from 300 to 850 meters when using an antenna 100 feet long, while the receiving wave is from 300 to 1100 meters. In converting these sets two things were aimed at primarily, simplicity of construction and ease of operation. Upon test the sets were found to oscillate readily over their wave bands, that the C. W. note was sharp and clear, and that the voice modulation was fair. It was also found that the sets would oscillate on an antenna 40 or 50 feet in length, which makes them ideal for target practice work where it is desired to install radio equipment on small boats. Also, the system of keying through a relay makes it possible to work duplex when using only a single antenna. The best radiation obtained was .98 ampere when using a fully charged 16-volt battery. It may be well to mention right here that the only expense is the cost of the panels, which are hard rubber 24 x 24 inches. Of course, a smaller size may be used if desired.

While the accompanying illustrations are more or less self explanatory, a brief description of some of the parts that must be built by hand may be of advantage. It will be noticed that the transmitting hook-up is a Hartley, almost identical with the C. W. circuit of the SCR-109 transmitter. All the necessary parts were taken from the BC-13-A set box with the exception of the transmitting inductance and the two fixed condensers.

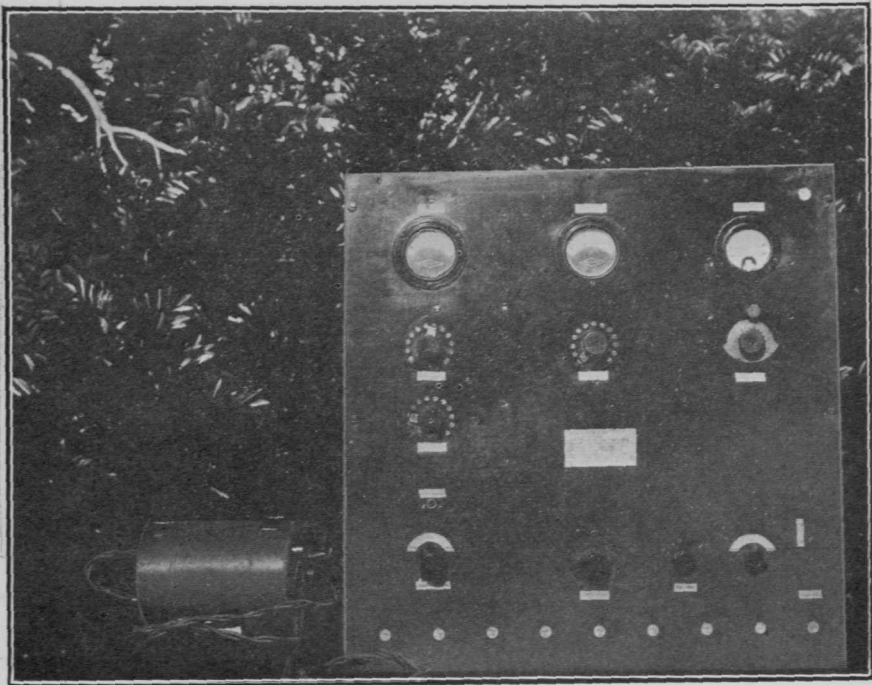
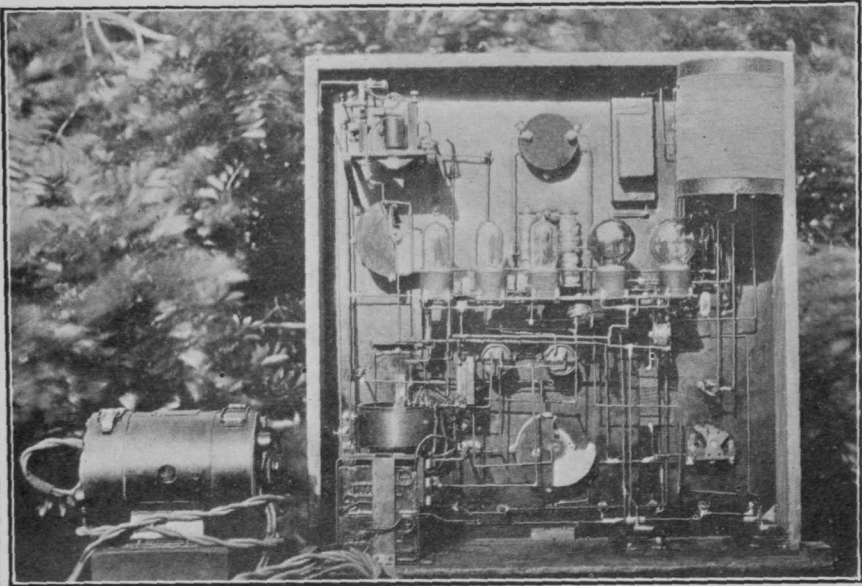
The transmitting coil was built in the following manner. A solid wooden form was secured, $4\frac{3}{4}$ inches in diameter by 6 inches long. A piece of flexible

brass and separated by mica dielectrics slightly larger than the plates. The assembled condensers are firmly secured by any rigid insulating material and the ends of each section soldered to insure good electrical connection. In



soldering, be careful to use rosin core, as acid flux, when hot, will spread to the plates, completely ruining the condensers.

It will be noticed that the key is in the relay circuit which in turn makes and breaks the plate circuit as well as the antenna circuit. When the key is down, the negative 500-volt circuit is completed and the antenna is connected to the



transmitter, but when the key is up oscillations cease and the antenna is automatically connected to the receiver. In this way duplex is secured when only using a single antenna. This system worked well as long as the received signals were strong and in most cases should be ideal for target practice where the distances covered are not great.

The receiver is of the single-circuit, regenerative type. This circuit was adopted because of its efficiency and stability and because the receiving parts taken from the BC-13-A lend themselves readily to this type. The hook-up is about the same as the original except the plate circuit is broken and leads through the tickler coil for regeneration. Also, the small individual resistances in the filament circuit are omitted and replaced by a fixed resistance of 2.5 ohms placed in the positive lead. If a small rheostat of 3 or 4 ohms resistance is procurable it will be better yet. The small condenser across the primary coil may be either included or excluded from the circuit and will increase the wave length of the receiver if desired. Also, the small condenser connected between plate and filament will insure oscillation for regeneration.

The illustration will show that all meters, including the voltmeter and its multiplier from the power board BD-1-A, are mounted at the top of the panel. This is merely for convenience and appearance. The dynamotor was also removed from its frame and mounted on a block of hard wood in whose base the smoothing-out condensers are mounted. These condensers are connected across the generator armature. Number 9 or 10 bare copper wire should be used throughout for wiring and if sufficient care is taken in the mounting and wiring up of the apparatus an efficient and neat appearing set will result. It is believed that if more interest was taken in this sort of work throughout the army and if more of the broken down and unserviceable radio apparatus was converted into useful sets, instead of being salvaged at a total loss, that the saving and benefit to the government would be considerable.

Military training teaches the poorer boys, who have not the training in athletics provided by the expensive preparatory schools and the colleges, the value of physical training, personal hygiene and health.—R. S. Lovett, Chairman Executive Committee, Union Pacific Railroad.

Permanent Squad and Platoon System for the National Guard

By CAPT. GEO. A. PATRICK, C. A. C.

Reprinted from the *Palmetto Guardsman*

A SHORT time ago, while discussing with an organization commander the desirability and practicability of organizing a National Guard unit on the squad system and training it on decentralized principles, I was informed that it had been given a trial and would not operate satisfactorily in the National Guard by reason of the irregular attendance of the men and the large turnover in personnel.

Believing firmly that such organization and training can be made to operate effectively, I suggested a method for his consideration and because of my belief in the method it is presented below for the consideration of other National Guardsmen who may be interested in the subject.

First will be presented the principles, methods and system of training prescribed in training regulations and then will follow the method by which it is believed they may be applied effectively in a National Guard unit.

PRINCIPLES OF TRAINING

All training should be founded upon the principle of stimulating and developing the national characteristics of initiative, self-reliance, and tenacity of purpose, and so molding those characteristics that they will at all times be responsive to the lawful direction of a superior. This demands that each individual be developed to the greatest possible extent, physically and mentally, and acquire the greatest possible efficiency in the specifications of his grade; that he be instantly responsive to the demands of constituted authority, and that he learn how to function in his team. An important feature of every phase of training is instruction in the art of how to train others.

METHODS OF TRAINING

Whatever method is used it should be progressive, should have a definite objective which is to be obtained in a minimum of time, should be executed on decentralization principles, and should employ the applicatory system in all possible cases.

The duties of each individual and unit should be analyzed into their component parts, and these parts arranged in logical progression. Standards of proficiency, based on time and quality of performance, should be prescribed and, generally, training should not be started in an advanced group of these

component duties until the minimum standard of proficiency has been acquired in the elements preceding.

Precision and exactness should be demanded, especially in mechanical operations, speed and celerity being acquired with practice. Movements of a purely mechanical nature should be practiced until their accurate and speedy execution becomes second nature even under the most adverse conditions. Training should be varied, and repetition should never be carried to the point of physical and mental exhaustion.

Every phase of training should have a well-defined objective thoroughly understood by those undergoing the training, and training for that objective must be conducted with energy and intelligence. Every act must have a well-understood purpose, and its relationship to the whole object of training, whether in study, drill, or practical application of principles and methods, must be inseparable.

The standards set for proficiency should be obtained in a minimum of time, not only as an economic measure imperative in time of war, but as a factor largely influencing the morale and initiative of the individuals undergoing training.

The applicatory system should be employed in all training. All the elements entering into a solution of the problem in actual combat should be presented and an opportunity given to apply to the situation the appropriate principles and methods.

SYSTEM OF TROOP TRAINING

Troop training is the preparation of individuals and units for battle, and involves study, drill, and practical application. It is a function of command.

Supervision, coordination, control of, and responsibility for the training of any command, including production of the necessary specialists, is vested in the commander thereof. The responsibilities of a commander for the training of his command extends to every individual and unit thereof, but the method employed by each commander in fulfilling this obligation will not extend to the actual conduct of training within the unit of a subordinate, but only to the supervision thereof, leaving to the commander of each subordinate unit full authority within the sphere of his activity and holding him to a rigid responsibility for results.

The character of the organization or unit, large or small, as indicated by its reason for existence, will determine the subjects in which proficiency is required.

In addition to the preparation by study as required by the commander, it is the duty of every officer and noncommissioned officer to devote himself, by individual application, to the acquirement of accurate knowledge pertaining to the requirements of his special office or position and to so much of the duties of others as will assure intelligent cooperation.

PROGRAMS AND SCHEDULES

It is the duty of the commander of every unit to prepare programs of training for the next lower units of his command and a schedule of training for his own units based upon War Department orders, the training orders of his tactical superiors and the present stage of training of the unit for which it is intended.

These programs and schedules should state the standard of proficiency to be attained at one or more stages of their course. The schedule prepared by each commander for his own unit, and the programs prepared by him for the next lower units should be carefully studied by the next higher tactical commander and necessary revisions ordered.

In peace, the period of time covered by programs and schedules will generally diminish from higher to lower units. In time of war, the same principles will apply, but training will be intensified, and programs and schedules issued frequently to accommodate rapidly progressing organizations.

INSPECTION

Inspection is a function of command and should be frequently made by commanders of every grade and their staff officers, to satisfy themselves that programs are being followed, that approved doctrines, principles, and methods are being used, and to test proficiency. No individual or unit should be tested, or a demonstration demanded therefrom requiring proficiency in advance of that required in its program, except upon application of the individual or the commander of the unit concerned.

METHODS OF INSTRUCTION

Any complete scheme of instruction logically divides itself into four phases: preparation, presentation, application, and examination. Much preparation is necessary before a subject can properly be presented by an instructor to his class. The presentation is the larger part of the actual instruction. The subject having been presented, students should be given an opportunity of practicing what they have learned by some form of application; after these three steps the student usually undergoes a test or an examination. At times it may be necessary to omit the third step "application." For example, in military hygiene the student rarely has a chance to employ or practice his knowledge before taking an examination.

PREPARATION

Under the heading of preparation there are several steps: first, "the mission," *i. e.*, to determine the purpose and scope of the subjects to be taught; second, "the estimate of the situation," *i. e.*, to determine the relative importance of the subjects, the time available for each, the effect of the season of the year, etc.; and third, "the decision" which takes the form of a definite program or schedule.

The matter of preparation applies all the way down to the noncommissioned officers who must understand what it is all about and what their part is in the scheme before they can be effective instructors. The first essential for an instructor is that he thoroughly understand the subject himself and the primary purpose of the noncommissioned officers' schools should be to instruct the instructors how to instruct.

PRESENTATION

As previously stated the presentation is the larger part of the actual instruction and it is the most important, also. One of the secrets of effective instruction is simplicity. Simplicity of method and simplicity of language. A good instructor makes a difficult subject appear simple; a poor one makes a simple subject seem difficult. We cannot gain simplicity unless we are clear in our expression to the point of being unmistakable.

The method of presentation should be as follows: first, define or state what it is all about; next, amplify these statements making free use of the rhetorical devices of comparison and contrast; and finally, illustrate the subject by an appropriate narrative story of an actual experience, by reference to a chart, a picture, or a landscape target, or by a demonstration, which consists in actually doing before the class the subject which is being explained.

APPLICATION

There are several general methods of application, one of the most important of which is competition. The psychological factor is of great value in the application step of instruction, and should be used to its full advantage. Individual competition, competition between squads, platoons, companies, and battalions should be employed whenever possible. Students should be encouraged to ask questions. No sincere question should be disregarded by the instructor, for no matter how foolish it may sound, it will serve to drive home the point under consideration, better, perhaps than by any other method.

Practice without supervision is usually worse than no practice at all. It might be pertinent here to point out the difference between drill and instruction because it is only too often that units drill when they should be receiving instruction. Take for example two similar units executing close order movements. One unit is marched backward and forward for a period of a half hour and all the movements prescribed in the schedule are executed. Nothing is said by anyone except to give or repeat the necessary commands for the movements. This is drill and is of benefit to the unit only after precision and exactness have been acquired by instruction and should only be participated in for the purpose of acquiring speed and celerity in the movements. On the other hand the second unit executes the same movements for the same length of time. Whenever the instructors see a mistake has been made the movement is stopped, the correct manner of execution is explained or demonstrated and the movement is executed again. This is instruction and at the end of the drill period real progress will have been made.

EXAMINATION

Examination may take the form of theoretical or practical tests. They may be oral, written, or executory. Questions must be clear, suggestive, and specific and should not require committing to memory data and statistics ordinarily found in reference works.

Having determined the principles, methods, and system of training required for the military service, the problem confronting the National Guard commander is to work out a scheme whereby he can put them into practical operation to insure having an efficient organization and still permit him to take a minimum amount of time from his regular business or profession.

Regulations require that in order to qualify for pay all national guard organizations must undergo instruction in uniform for one and one-half hours at least forty-eight times a year. It would therefore seem that an ideal scheme would be one that could be made to operate effectively without requiring the officers to devote more than forty-eight evenings a year to it.

The following scheme is presented not as an ideal solution of the problem but as a stepping stone toward attaining such an ideal.

The commanding officer of any organization is responsible for the instruction, tactical efficiency, and preparedness for field service of his command and for the proper performance of duties connected with its pay, clothing, accounts, reports, and returns. This does not mean that the commander performs all these duties himself. In fact, if he tried to do them all he would be hopelessly swamped and his subordinate officers would not get the training necessary for them to perform the duties of the next higher grade satisfactorily when the time for promotion comes.

The unit should therefore be organized for administration and training on decentralized principles whereby each subaltern is assigned certain specific duties in connection with administration and training and he should be held strictly responsible for results.

ORGANIZATION FOR ADMINISTRATION

The efficiency of an organization can, in general, be fairly well estimated from the promptness and accuracy with which its paper work is handled. Reports and returns should be prepared, checked, and forwarded at the times prescribed. Monthly reports might well be prepared on the night of the last drill during the month and then mailed on the first of the succeeding month.

One subaltern should be put in charge of this routine office work. Under his supervision and with the assistance of the First Sergeant and the necessary clerks all rosters, accounts, reports, returns, and other paper work should be prepared for the signature of the commander and his initials on each paper should indicate that he has examined it and found it to be correct. He should remain at the armory after the conclusion of each drill until all paper work has been brought up to date.

Another subaltern should be put in charge of the arms, equipment, and other property issued to the organization. He should adopt or devise some system of property accounting and record keeping so that the exact condition of the property may be determined at any time by inspection of this record.

A physical inventory should be made at least once every six months and any shortages found should be charged on the next payroll against the men losing same or a report of survey should be initiated. If the property is systematically arranged and the records are properly kept it will not require a great deal of time to make the inventory. Blank forms should be provided for corporals to check the clothing and equipment in the hands of the members of their squads, and for platoon leaders to check the property in the hands of the Sergeants and Corporals. All property should remain in the armory so that the clothing and equipment issued to men who are absent on the night of the inventory may be checked in their lockers.

ORGANIZATION FOR TRAINING

Organization for training requires careful and intelligent planning on the part of the commander. Subalterns should be assigned definite duties in connection with the tactical training of the unit.

The outcome of this planning is the preparation of a training program or schedule covering a certain phase of the training. Without a detailed training schedule it is hard to conceive how any unit can make sure and steady progress. Schedules, in general, should not cover a longer period of time than three months, and should show the details for each drill, as, for example:

<i>Time Min.</i>	<i>Subject</i>	<i>Troops</i>	<i>Place</i>	<i>Method</i>	<i>Text</i>	<i>Instructor</i>
60	School of squad	All	Armory	App.	Pars. 1-12, T. R. 420-50	Cpls. under close supervision of Sgts. and officers
30	First aid	All	Armory	Lecture	Pars 4-9, T. R. 112-5	Lt. Jones

At the conclusion of each phase a test or inspection should be given to determine whether or not the objective has been attained and what corrective measures, if any, should be applied. Credit should be given for proficiency on the organization training chart mentioned below.

SCHOOLS

Officers, noncommissioned officers, and specialists schools should be held each drill night, the officers and noncommissioned officers being required to report ahead of the time scheduled for assembly.

It is believed that the officers' schools will be more effective if they take the form of appropriate army correspondence courses. It is surprising how quickly a course may be completed if only a little is done on a lesson each week.

Noncommissioned officers' school should be conducted by one of the officers, each officer taking a turn. The primary purpose of this school is to teach them

how to be effective instructors. It is better to have the school precede the drill rather than follow it.

The officers conducting the school should have a copy of the drill schedule for the night and should announce what the instruction is to consist of. He should then explain the movements to be covered and then call on different members of the class to demonstrate how he intends to put the instruction across, using the other members of the class to practice on. Incorrect methods of instructing should be pointed out and the correct method explained.

Specialists' schools should consist of having them study or practice their specialty either with or without supervision as deemed necessary. It should be carried on concurrently with the regular drill or instruction.

SQUAD AND PLATOON ORGANIZATION

Every member of the organization should be permanently assigned to a definite squad or platoon. Platoons may be classified as "regular," "reserve," and "recruit." The size of the platoons will depend upon the strength of the unit, the number of recruits, and the number of men who are regular attenders.

Regular attenders are assigned to squads in the "regular" platoons. Irregular attenders are assigned to the "reserve" platoon, and recruits are assigned to the "recruit" platoon. This recruit platoon should be put under charge of the best drillmaster in the organization regardless of his grade and the members should not be assigned to "regular" or "reserve" platoons until they have completed and successfully passed tests in the subjects enumerated in "Recruit, Instruction, National Guard." (W. D. M. B. Document No. 912, 1925.)

When the unit is formed, all men fall in according to their permanently assigned places in ranks leaving the places of absentees blank. After the roll is called any squad in the "regular" platoons without a corporal is broken up and the men are used to fill in the blank files of the other squads. The members of the "reserve" platoon may also be used for this purpose or additional squads may be formed.

It is believed that some such system will tend to cause the squad and platoon leaders to take a more vital interest in their squads and platoons and make them realize more fully that they have responsibilities as instructors and leaders of units. Also that it will promote efficiency and team work as the same men will, as a rule, always be grouped together and receive instruction from the same person.

A training chart as shown in Appendix II, Notes on National Guard Training, 1925-1926, is a very satisfactory means of keeping a record of such organization up to date. The chart is much more satisfactory if constructed out of blackboard material having the divisions and headings of the columns painted in white.

The competitive spirit should be fostered between squads and platoons, and frequent competitions should be held. Attendance, appearance, and proficiency

should all be given relative weights in determining the winner of a competition and some suitable award or prize should be given.

Every absentee, or man reporting late, should be interviewed by the commander and if the explanation given is not satisfactory appropriate disciplinary action should be taken. Any funds accruing from this source might well be utilized to provide prizes for the competitions.

The instructional value of the free use of charts depicting various formations or movements is considered worthy of mention. Relatively few men in any organization know the exact position each unit or man should occupy in any given formation. However, if there were a chart on the wall showing the exact position of each unit or man in a particular formation it is believed that natural curiosity would cause a large number of men to inspect the chart while they are standing around and thus they will pick up a certain amount of information that they otherwise might not get. In addition these charts are valuable during lectures, etc., and may save a great many references to training regulations.

SUMMARY

To summarize briefly, it is believed that the above scheme embraces the training principles of developing initiative, self-reliance, and team work; that it provides for a progressive method of instruction with a definite objective for each phase of training, organization on decentralization principles, and the use of the applicatory system; that it involves preparation of individuals and units by study, drill, and application, and supervision, coordination and control by the commander; that the method of instruction is proper; and, last but not least, that it can be effectively operated if one night a week is conscientiously devoted to the matter.

The man who has received the training is a better citizen, is more self-respecting, more orderly, better able to hold his own, and more willing to respect the rights of others and at the same time he is a more valuable and better paid man in his business.—Theodore Roosevelt.

Dismounting and Moving Seacoast Guns and Carriages

By FIRST LIEUTENANT VERNE SNELL, C. A. C.

OUR service is constructive and progressive. Each year this is impressed upon us as we see some familiar piece of fire-control equipment relegated to the scrap heap, or some theory or method of procedure which is supplemented by something new and up to date. We see our fixed armament becoming a thing of the past. The present trend is toward a service of mobile heavy armament and only those guns which are considered too heavy for a railway mount are permanently emplaced.

Due to changes in ship types, greatly increased ranges, deeper drafts, and greater speeds, some of our artillery posts are no longer necessary. The armament will serve no further use in place and so it is removed. The guns may be later returned to us on railway mounts.

We are taught the latest methods of handling and emplacing mobile guns. It becomes routine. If we are at a loss on some unfamiliar point we can study the texts and decide what is to be done.

There are no blueprints which show us how to remove the guns of a battery which is to be salvaged. We can find nothing in print to show us the details of the work to be done. No job sheet gives us a list of the materials. They have probably been in for more than thirty years and the men who put them in are gone. The work is generally to be done at a post where there are only a few caretakers and often these are retainers whose useful days are mostly of the past.

We have then in this problem a number of questions to answer before we can begin the work. How much blocking of various sizes do we need? How far do we have to haul the guns and what method will we use to move them? What is our heaviest piece and how many men are needed to maneuver it?

In seeking the answer one naturally tries to visualize the process of emplacing the carriages and mounting the guns. We can see in our mind's eye the stacks of cribbing making up the run way by which the piece of carriage was moved into place from the rear of the emplacement, and how the gun was later brought over the same trestle and gently lowered into its trunnion beds.

We possibly learn that the guns were brought up on a railway. It is now a streak of rust. We have a high hill on our path. Let us hope it is one to go up rather than down, because if tackle breaks, it is generally on the first heavy strain.

We find that it took months to put together the carriages, and that the working force was an artillery company or a large civilian crew.

The answer then looms large in time and men and, if the material is to be

taken out by the same methods as were used in placing it, the answer will indeed be large in terms of time, material, and men.

Let us, then, come down to a specific problem and see how the answer worked out.

Last spring I was ordered to proceed to one of our obsolete harbor defense posts, now garrisoned by Infantry, and estimate the amount of material, the number of men, and the time necessary to remove and ship two 3-inch guns and pedestal mounts, two 6-inch guns and parts of their disappearing carriages, three 10-inch guns and a great many parts from two of the later type carriages. The parts of the carriages which were not saved were to be sold for scrap.

I arrived at the post and found my assistant, an ordnance machinist who was familiar with the place and had done work of the same type, in fact had dismantled some of the same guns during the World War. In the caretaking detachment I found eleven men, only seven of them initially available. Of this detachment only one was an experienced Coast Artilleryman, the others being replacements from the Infantry. They knew how to apply grease and paint and knew a little gun drill but only one could tie a bowline or a becket. The narrow-gauge railroad on which the guns had been hauled from the dock to the emplacements was warped, ties rotted out, trestles down, and some sections missing altogether. The average haul to the dock was about one and a half miles, mostly over good roads. One bad hill could not be avoided and the guns had to be taken downhill. Last but not least to be taken into consideration was a Quartermaster who had seen the effects of hauling heavy loads over asphalt pavements with a tractor and who was very much, and rightly, worried about his pavements.

Supplies of materials were ample and included blocks of all sizes and timbers of various sizes and lengths, shingles, tackle, rope, a ten-ton trailer, a ten-ton tractor with capstan, and some 15- and 30-ton jacks in poor condition.

It was desired to use the current year's appropriations to pay the freight charges on the guns and carriage parts and the deadline was only two months away.

The initial estimate of the situation looked something like this:

- a. Take out two 6-inch guns and haul to dock. Strip off parts of carriage. 2 weeks.
- b. Take out two 3-inch guns and pedestal mounts and haul to dock. $1\frac{1}{2}$ weeks.
- c. Build sled to haul 10-inch guns. $\frac{1}{2}$ week.
- d. Roll out and haul three 10-inch guns to dock at three weeks per gun. 9 weeks.
- e. Salvage base rings, rollers, racers, and some small parts from two 10-inch disappearing carriages. 6 weeks.

Making a total of nineteen weeks, or twice the amount of time available—this estimate predicted upon the assumption that at least twenty Coast Artillerymen would be added to the detail.

While waiting for the man-power question to be decided by higher authority, the small detail available started to work. The sled was built from 12 x 12 timbers, 3 feet wide and 12 feet long. The 10-inch guns were to be placed on this, one at a time, a roadway built of planks, and the gun moved by tackle and capstan by means of 8-inch rollers. This, of course, could not be done without a large detail to handle rollers and planks.

It was decided that the caretaking detail would be broken in on the 6-inch battery. About ten tons of blocking, tackle and timbers were hauled to the emplacement.

Cribs were built next to the front wall under the breech and muzzle, the gun being traversed until the breech was against the cement; 10 x 10 timbers were laid on a slant to the emplacement floor, the gun tripped, and trunnion caps removed. The gun was retracted enough to raise the counterweight off the floor, blocks placed under the weights, and the gun forced into battery again. The cribbing was then built up tight against the gun and the nuts taken off the suspension rods. The muzzle of the gun was then pried up until the trunnions were clear of the beds and then the top carriage, minus the gun, was retracted until the gun arms were down out of the way. Ropes were then rigged from an anchor, around the gun at muzzle and breech and to anchored capstans on the parapet. The gun was then slowly lowered by rolling down the inclined way until it was in position to load on the 10-ton trailer. To take out and load this gun required $2\frac{1}{2}$ days. The tractor was then coupled to the trailer and the load soon landed at the dock and rolled off on timbers.

I decided that $2\frac{1}{2}$ days was too much time to spend on one 6-inch gun, so planned to load the other gun from the parapet. The tractor took the trailer up and spotted it in position. Cribbing was put in about eight feet from the wall at the breech end and a light cribbing placed under the muzzle. The same procedure was followed in preparing the gun except that the timbers on which it was to roll were placed directly under it and took the weight as soon as the suspension rods were loosened. The gun was rolled up a slight incline by using the same principles as before. In this case only one rope was used. It went from a dead man to the gun at the trunnions, around the gun five or six times, then through a snatch block and to the tractor. It required $1\frac{1}{2}$ days to land this gun at the dock, several hours of which were used in getting the trailer out of a bad hole in the road.

Several days were spent at this battery to take off the crossheads and parts of the tripping mechanism. The crossheads are held to the gun arms by two large pins, and to the suspension rods by two pins slightly smaller. All four of the pins are held in place by set screws set straight in on the circumference of the pin. These screws had been in place for thirty years. It was necessary to bore 50% of them out by means of a jig operated by hand.

The total time used at the 6-inch battery was two weeks, which was better than the estimate because for several days of that time only two or four men were available.

No particular problems presented themselves at the 3-inch battery. The guns and carriages were handled piecemeal by means of a shears, the two legs of a gin. The road leading to the battery was so slippery that we had to use an escort wagon with a short link to the tractor to haul the guns away. The work was completed in five days.

About fifty tons of block and timbers were now assembled at the battery of two 10-inch guns; both guns were rolled forward on the parapet. It was found necessary to use two 12-inch timbers in rear of the elevating trunnion band and a 10-inch timber in front of it. Even then the gun arms would not clear and the guns had to be rolled up 4 to 6 inches to clear the one gun arm. In this case a piece of light railway iron was used on the timber under the muzzle so that the muzzle could be slid along to keep up to the travel of the breech. This was necessary on account of the restricted space in which the elevating trunnion band travelled. The time used at each gun for building the cribbing, dropping the counterweights and gun arms, and rolling the gun was slightly in excess of one day. The weight of each gun was $34\frac{1}{2}$ tons. Jacks were used for the first time on the second gun.

As mentioned before, the jack packings were not in working condition, not having been used in eight or ten years. These were replaced and the jacks filled with the compound now used, "Jack-O," alcohol prepared so it is not drinkable. The preparation ate up the leathers in three weeks time, so plain water was used. Hydrolene oil would be satisfactory in cold weather and would not rot the gaskets as quickly as "Jack-O."

Some time previous it had been decided that no men would be available to augment the detail until after September 1. It became a question then whether to mark time or continue on the carriages. In looking over the maneuvering material I had noticed timbers for a derrick—a mast 55 feet in height and 12" x 12" with a 10" x 12" boom 45 feet long. It was thought to be dryrotted, but the strength when new was so high I decided to get it out. About one thousand feet of $\frac{1}{2}$ and $\frac{5}{8}$ steel cable was located and some heavy blocks rigged. Five cables from the cap served as guys and were carried to trees in the vicinity of the battery. The derrick was raised by using the boom as a gin pole and the tractor as motive power. When in place the derrick was able to pick up a piece of carriage and lay it on the battery parade below or on the parapet above. On both carriages the gun arms, crosshead, and suspension rods were removed by pieces (total weight $7\frac{3}{4}$ tons). The counterweights were then lifted out and stacked up for shipment. The top carriage was freed of its brackets and pulled off to the rear. The webbing of the carriage side frames was taken out, the shafting driven out, and each side frame lifted away. The cement was chipped away from the joints of the racer and the racer lifted out in one piece (15 tons), as it was impossible to reach the bolts underneath with the racer in position. The racer was then stacked on the battery parade ready to ship.

Time on this carriage was $12\frac{1}{2}$ days' working time. Time elapsed was much greater due to tractor breaking down.

On the next carriage the arms, head, rods, counterweight, and top carriage were stripped and the side frames loosened from the racer. When we tried to pick it up (about 20 tons) the cable slings and tackle broke and it was necessary to use 7-inch rope in place of the 5-inch which had sufficed up to that time. With a 7-inch rope and $\frac{5}{8}$ -inch cable slings carefully placed, the tractor picked the carriage up and it was set out on the emplacement.

The racer was removed as in the case of the previous gun. Time spent on this gun $6\frac{1}{2}$ days, a saving of six days over the other gun, principally on account of the method of handling the carriage.

Next came the base rings weighing 20 tons each. The connecting flanges are embedded in the concrete of the emplacement and have to be drilled or blown out. T. N. T. was used with a large size electric cap. The battery power circuit was used to fire the caps. On one racer the holes were drilled from the inside of the well, and on the other the holes were drilled down from a point outside the racer. Both methods work, but boring from inside the well seems to produce a better job. Cement that stuck to the flanges was cracked off by using $\frac{1}{2}$ to 1 block of T. N. T. at a time, the T. N. T. being packed against the cement with wet clay. About four working days were required on each base ring. They were taken apart in the emplacement and each piece lowered to the battery parade.

In the meantime we had inspected a number of heavy trailers used by contractors to haul steam shovels. They ranged in capacity from twenty to sixty tons. Prices were arranged, and this method of moving the three heavy guns promised a saving of well over a thousand dollars, and so the Ordnance Department gave us an initial allotment of three hundred dollars to cover rental.

Another tractor was shipped in to replace and supplement the one which we had been using. Bridges were built to accommodate the big trailer in getting onto and off the parapets. The third gun was rolled out and arrangements made to get the trailer. Then it rained. Roads were washed out. The cribbing under one gun was undermined and $34\frac{1}{2}$ tons of gun went nearly out of sight in the mud. One week was spent in repairing the damage, and then the trailer was brought onto the job.

The trailer used was almost 32 feet long. Front axle on a fifth wheel and goose neck, two longitudinal axles in rear each mounting a transverse axle with a double wheel on each end, four expanding brakes on rear axle with a brake wheel forward on the goose neck. It had solid rubber tires all around. The platform was 28 inches from the ground. Clearance of side frames from ground, 6 inches. Rental charge, sixty dollars per day.

The trailer weighed 15 tons, gun $34\frac{1}{2}$, blocking a ton or so, and two tractors ten tons each, making a weight of from sixty to seventy tons moving on our bridges at one time. Decking was 6-inch to 8-inch, with 10" x 10" beams resting on sills at the ends and blocked every six feet of their length.

The single gun was taken first; loading averaged about two hours. This gun had to be hauled over a morass of mud for over a quarter of a mile by

blocking the road and using a tackle and tractor capstan. It took over three days to go a quarter of a mile, and less than half a day to go the other mile and a half.

The other two guns were handier to a gravelled road and offered no particular difficulties. Six days sufficed (by working from 6:00 A. M. to 9:00 P. M.) to move all three guns to the dock and place them on timbers. Time, 6 days instead of 9 weeks. Detail, 7 men instead of 30.

The method of loading and unloading was in principle the same as that used in rolling the guns out of the trunnion beds, except that the dead end of the cable was fastened to the trunnion and given several turns around the gun and the rope end carried to the capstan. Twelve by twelve timbers were used for a track in rolling. In moving the muzzle to keep up with the breech a jack was set at a 45-degree angle which slid the gun along at a fair rate.

The method of taking this load of 50 tons down the hill to the dock was the same as used by the owner of the trailer in moving heavy loads. His motive power was two Mack trucks. We used a tractor on the front to haul, the other tractor and two trucks on the rear end to hold back. The weight on the road bed was slightly less per inch of cross section of tire than a five-ton Mack truck with a three-ton load. A 320° turn was negotiated in the center of the hill without difficulty. The shortest time taken to unload one gun was fifteen minutes and the longest about an hour.

The weights handled by this small crew in the space of three months, with a crew of not over seven men, were:

Blocking 100 tons.

Three guns at 34½ tons each, 103½ tons.

Two chassis with top carriages, piston rods, trunnions, and assembled gearing, 41 tons.

Base rings and racers, 39 tons.

Gun levers, crossheads, suspension rods, 15 tons.

Load counterweights, 112 tons.

Total, something in excess of 410 tons.

Thus was the old "block and jack" system done away with and seven men performed the work that formerly took a company.

Mechanization in Europe

By MAJOR C. C. BENSON, Cavalry

EDITOR'S NOTE.—*The following discussion extends the field covered by the author's 1927-1928 articles on "Danger Zones." By arrangement between the author and the editors, this article appears in publications other than the COAST ARTILLERY JOURNAL.*

AFTER a decade of sensational aircraft development, military leaders abroad are apparently ready to come down to earth. Competition between private companies insures progress in the air, and army leaders can now devote more attention to equally important matters in other fields. The present urge is towards fighting machines for ground troops, as evidenced by improved tanks, gun carriers, and mechanized forces that have appeared in foreign armies. Tanks are now used in the armies of Brazil, Chili, Japan, Persia, and seventeen European nations. Some of these machines are relics of the World War; others, especially in Europe, are vastly improved new models which have resulted from rapid progress in the automotive industry. The new cross-country fighting machines combine sustained speed with tremendous hitting power, and provide armored protection for the crews. They promise to shift the emphasis in combat tactics from fire to movement; and as they far surpass the World War tanks, they will probably make good their promise. It may be of interest to examine some of the political, economic, and military considerations involved in the mechanization of armed forces in Europe.

We shall first consider the situation in Europe as a whole. Russia is alone; the continental countries are paired off in mutually distrustful combinations; and Great Britain, with the interests of her great empire at stake, exerts a powerful influence on all the others. The small Baltic states—Latvia, Esthonia, and Lithuania—have precariously maintained national independence; but they are essentially Russian, and if they become convinced of the stability of the Bolshevik regime, it would not be surprising to find them joining the Soviet Union. Germany and Austria have much in common, especially in their attitude towards France, and are drawing closer together. France maintains her cordial relations with Great Britain, and heads a group of smaller nations including Belgium, Poland, and the members of the Little Entente—Jugo-Slavia, Roumania, and Czechoslovakia. The power and prestige of France are indicated by her ability to preserve the Little Entente, which now serves as a check upon Italian ambitions in the Balkans. Italy, friendly with Great Britain but intensely jealous of France, has partially succeeded in aligning Albania, Hungary, Bulgaria, and Greece. Despite the fact that the independence of Albania is guaranteed by the League of Nations, Italy has practically converted that country into an Italian province. She has thus bottled up the Adriatic and secured a firm foothold on the Balkan peninsula. Great Britain, with definite commitments under the Locarno Pacts, is greatly interested in maintaining the status quo and peace in

Europe. In Asia and Africa, important British interests conflict with those of the Russian communist leaders; Great Britain's chief concern is to checkmate the international revolutionary program of the Bolsheviks. The League of Nations reflects the alignments indicated above and can do little more than provide an open forum for the discussion of international problems. Vital questions involve national decision and action rather than international arbitration. Such regional compacts as have been registered with the League are primarily security measures which tend to establish a new "balance of power" in Europe. So long as a spirit of mutual distrust and fear governs European nations, there can be no assurance of continued peace.

RUSSIA

Russia dominates the troubled outlook of the powerful European nations. Her unceasing efforts to foster world revolution for proletarian dictatorship, and a standing army of a million men, are a constant menace to the peace of Europe. The Bolsheviks, up to the present, have relied mainly upon well financed propaganda to spread their revolutionary doctrines. Joseph Stalin, now virtually a dictator, has consistently followed Lenin's policy that "the soundest strategy in war is to postpone operations until the moral disintegration of the enemy renders the delivery of the mortal blow both possible and easy." Control of the Third Internationale, the central governing body of communists of all nations, enables Stalin, without officially compromising the Russian government, to propagate communism throughout the world. Communist disturbances in China, India, and South Africa show the effect of inflammable material that the Third Internationale for ten years has been spreading among the yellow, brown, and black races of Asia and Africa. Recent disorders in the French army and navy, of proven communist origin, indicates that Stalin still considers propaganda the most effective advance guard for proletarian armies. The international effects of Bolshevik policy and action, whether applied to European nations or to their foreign interests, are of vital importance to the peace of Europe. Communism is frankly imperialistic, with the world as the limit.

While propaganda is doing fruitful work abroad, the Bolsheviks are building up political and economic strength at home. They have a definite program, strong organization, and leaders who maintain discipline. Trotsky and his associates, once powerful in the party councils, are now in exile because they threatened to disrupt the party organization. At present the Communist Party includes less than one per cent of Russia's 140,000,000 people, but schools for children and adults are rapidly educating the masses in the teachings of communism. The peasants, who have had possession of their farms for the past twelve years, will not readily accept the communist theory that all land belongs to the state; the workers employed in subsidized national industries are more easily persuaded. To maintain their power, the Bolsheviks must foster industry and convert the new industrial workers to communism before the

agricultural peasants can effectively interfere. Plans calling for capital investments in 1928 of over \$600,000,000 for industrial plants and equipment, show the urgency of their economic program. An outstanding feature of the new economic order is the Industrial Planning Commission, which aims to eliminate the waste that accompanies haphazard development. It analyzes national economic problems and allocates industrial projects in accordance with national needs. The Bolsheviks have made strenuous efforts to secure enough capital to finance their gigantic industrial projects and to equip existing plants with up-to-date machinery. Their success may be judged by results; despite seven years of continuous war (1914-1920), Russia is now stronger politically and economically than she was in 1913.

The Russian military situation remains to be considered. Ever since the diplomatic break with Great Britain three years ago, the Bolsheviks have conducted an intensive propaganda campaign at home to convince the people that the Soviet Union must prepare to defend itself against attacks by capitalistic industrial nations. Flat rejection at Geneva of the 1927 Soviet proposals for complete disarmament gave this campaign fresh impetus. The Soviet representative, M. Litvinov, proposed to dissolve all armies, navies, and air forces; to destroy all weapons, military stores, and means of chemical warfare; to scrap all warships, fortresses, naval air bases, and war industry plants; to abolish all general staffs; to discontinue all citizen military training and all appropriations for military expenses. Appropriations for revolutionary propaganda were not mentioned. On April 16 of this year, M. Litvinov renewed these proposals in an address before the League of Nations preparatory disarmament commission. His eloquence left the delegates unmoved, but no doubt served well for home consumption. Anticipation of foreign aggression has resulted in the formation of a national association, with millions of members throughout Russia, for protection against gas and air attacks. In September, 1928, the effectiveness of air and gas defensive measures was tested in a maneuver at Kiev, a Ukrainian city of some 525,000 inhabitants. Business activities were practically suspended during the maneuvers, and the entire civilian population cooperated enthusiastically with the military authorities. In preparation for this exercise, the local newspapers published detailed instructions and dwelt upon the necessity for such thorough organization that in the event of war the city could protect itself unaided. The simple minded Russian apparently takes his "preparedness" seriously.

If convinced of the hostile intentions of foreign nations, the Russian masses will look upon any war as a struggle for existence. Army units, from the regiment up, are subjected to direct supervision by special political agents who spare no pains to instruct recruits in the Bolshevik ideas of communion. As compulsory service brings a new class of about half a million men into the army each year, these political agents have excellent opportunities to exert great influence. Russia's available military man power numbers about fifteen million men, many of whom have received military training. The armed forces include

250,000 secret police (O. G. P. U.); 600,000 regulars on active duty; 500,000 well trained men in the regular army reserve; and 800,000 in organizations that correspond to our National Guard units. The junior officers are mostly products of the army school system; their leaders are the ablest survivors of recent national and civil wars which gave them plenty of combat experience.

During the past eight years, airplanes, gas, and tanks have received special attention. Russian-built planes have been widely used to carry communist propaganda into outlying provinces and to demonstrate the power of the present regime. With powerful support from the government, and probably the assistance of German engineers, the Russian aircraft industry has made great progress. Chemical industries have been fostered, and their products applied to military training, especially in connection with tanks. Their machines are said to have gas-proof hulls and oxygen containers for purifying air in the fighting compartments, in addition to gas masks for members of the crew, and many of them are fitted with devices for producing gas or smoke. Why these elaborate precautions? The use of lethal gas and toxic smoke in war has not been outlawed, even by the United States, and, regardless of public opinion on the subject, chemical agents will probably be extensively used in future wars. When we realize that a single machine can carry tons of casualty producing chemicals and can operate in spite of gas attacks by airplanes, this development appears worthy of most serious consideration. Whether the Bolsheviks have developed practical methods of degassing contaminated machines is unknown. They first acquired tanks in 1919 and 1920 by capturing about forty French and British machines that had been turned over to Denekin and Wrangel. The captured machines have been rebuilt to improve mechanical performance, increase fire power, and add speed. New tanks have been purchased abroad, and work is now in progress in Russian factories on machines of Russian design. Light and medium tanks predominate, though some work has been done on an eighty-ton tank with two 76-mm. guns, 1.6-inch armor, and a maximum speed of six miles per hour. For the control of these machines, radio sending and receiving sets have been developed. Armored cars, armored railway trains, and self-propelled cross-country supply vehicles have received considerable attention. Training regulations apparently contemplate the use of all these armored vehicles in co-operation with cavalry divisions, air formations, and independently in large numbers. The tanks now in service in the Red Army are probably twice as effective as those used by the Allies during the World War.

If the Bolsheviks intend to follow up their revolutionary propaganda, Mechanization has arrived at a most opportune time. Their willingness to try new methods is unquestionable; they have used all of Russia for the past twelve years as a testing laboratory for the greatest social experiment the world has ever seen. They must push on or fail, for even in Russia the social order has begun to stabilize without conforming to purely communistic ideas. Increased discontent among the farmers may force the Bolsheviks to seek war abroad as a means of retaining control at home. Their leaders are shrewd enough to realize

that new weapons, if properly developed and used, will give the Red armies superior offensive power. Fighting machines will partially relieve them of dependence upon mass armies of uncertain loyalty and concentrate war power in the hands of trusted party members. Even though vastly in the minority, they could effectively police the country and still carry on offensive operations. Mechanization will help greatly to solve their transportation problems. Railway construction has increased the 1915 mileage by twenty-five per cent, and the rolling stock now in service is about thirty per cent more than in 1923; but the railways are still entirely inadequate for the rapid movement and supply of great armies. Mechanization of expeditionary troops would reduce the number of men and the tonnage of food, clothing, arms, and ammunition that would be required initially for decisive operations. By eliminating many of the items that were considered essential during the World War, the Bolsheviks could probably maintain powerful mechanized forces in theaters formerly beyond their reach. A surprise attack towards the west, swiftly delivered, would overwhelm the disunited forces that might be assembled in opposition. The small states—Poland, Czechoslovakia, Jugo-Slavia, and Roumania—that now form a feeble barrier between Russia and western Europe, are poorly prepared to defend themselves. All are suffering from internal political struggles which have retarded economic development; and all are engaged in more or less serious disputes with their neighbors. The Bolsheviks have never admitted the validity of Roumania's title to Bessarabia and have unceasingly poured communist propaganda into that sadly misgoverned province. Communist uprisings would probably occur if Red forces moved westward through Bessarabia. If we recall the victorious campaigns conducted 500 years ago by the horsemen of Jenghis Khan in their conquest of a large part of Europe, it requires little effort to picture fast cross-country fighting machines in a similar role today. Superior mobility on the battlefield is just as effective now as it was 500 years ago.

Can the Reds produce and maintain a formidable mechanized force? Such forces as are known to exist are too weak for decisive use at present, but they show surprisingly rapid development. Eight years ago Russian industry was a mass of wreckage; now it is able to produce reliable airplanes and fast tanks. A few determined men in control of highly centralized governmental machinery have secured remarkable results along the lines they have chosen to follow and their facilities for the manufacture of war equipment are constantly improving. Industry is already largely nationalized—a tremendous advantage if the leaders desire rapid expansion of their mechanization plans. By concentrating on the production of war equipment, these industries, even in their present state of development, could probably supply the needs of the army. Domestic supplies of basic raw materials, oil, and fuel are available. The Industrial Planning Commission has no doubt provided for the necessary manufacturing plants and equipment; and, judging by results already obtained, has to some extent remedied the deficiency of technically trained operatives. So far as the army itself is concerned, remodeling would be comparatively easy. The army is

young and lacks fixed traditions; consequently there would be little passive resistance to the change. Few vested interests would be disturbed either in the combat forces or in the supply branches. A shortage of suitable officers and men to maintain and operate the machines in the field might restrict their use; but similar difficulties were overcome by the Allies during the World War when the drain on man-power was far more severe than Russia has experienced for some years. The Soviet Union contains many diverse elements and it would be strange indeed if 140 million Russians could not supply the few thousands that would be needed in a mechanized force. Changes wrought by the Revolution, for better or for worse, have given the younger generation a new outlook on life. Whether the men now coming of age accept communism or not, they are far more alert mentally and physically than were the peasants of pre-war days. This fact should be recognized in estimating their potential value for service in mechanized units.

Expense is another item that must be considered. From the peaceful taxpayer's viewpoint, investment of large sums in fighting machines appears extravagant. The machines may be obsolete before there is any occasion to use them. However, the Bolsheviks control the purse strings of the Russian government; they have spent large sums, needed for internal development, on propaganda abroad, and certainly will not hesitate to invest heavily in fighting machines if they see fit. In addition to direct taxes, the government has a large income from its complete monopoly of foreign trade and from concessions that have been leased to foreign corporations. It owns the raw materials, manufacturing plants, and all banking institutions. Funds to pay for the manufacture of fighting machines would have to be taken from other projects, but there is no doubt that ample funds could be made immediately available. In figuring expense, the initial outlay is a small part of the total required for active operations in war. An article by Mr. Herbert W. Alden, in the *S. A. E. Journal* of May, 1919, referring to the use of British tanks at Cambrai in 1917, states, "The saving in ammunition—which would have been used according to the old system in this one engagement—equalled the entire expense of the tank development up to that time." Mr. Alden's valuable work in our Ordnance Department during the war enables him to speak with authority. If other savings, such as man-power and transportation, are added into the account, the balance is strongly in favor of mechanized war equipment. The Bolsheviks could easily justify their expenditures for fighting machines on the grounds of eventual economy.

Under able and determined Bolshevik leadership, Russia can no doubt produce and maintain strong mechanized forces. Reliable information about the Red Army is scant; hence, some of the foregoing discussion is necessarily based on conjecture. Directives have been issued for the formation of independent mechanized units and for a large number of tank regiments; and regulations for their training have been published. To what extent Russian mechanization plans have been executed is uncertain; but one thing is sure—progress

in the organization of mechanized units will whet Bolshevik zeal for world revolution.

GERMANY

The Treaty of Versailles prohibits the use of tanks in the German army. This fact endows mechanization with exceptional interest for the younger generation, and the World War experiences of the veterans serve to stimulate serious study of the subject. Those most interested in the construction of fighting machines have sought employment in countries where treaty restrictions do not apply. German technical experts have assisted in the production and presumably in the operation of Russian machines. The new Czechoslovakian tank, of the combined wheel and track type, was designed by Herr Vollmer, chief engineer for the construction of German tanks in 1918. It is perhaps significant that the Swedish tank, which can find little employment on Swedish terrain, is remarkably similar to the light tanks that Germany was forced to dismantle in 1919. Dummy tanks propelled by man power are being used for training purposes at home; but abroad German engineers are perfecting their designs and gaining experience in methods of construction. There can be little doubt that certain German factories now have blueprints and tools for making modern tanks that have been thoroughly tested. When circumstances change, Germany will be well prepared to apply her highly developed industries, if need be, to the rapid production of war machines.

In the meantime, antitank defense receives great attention. The proposed defensive measures are naturally based on disastrous World War experiences, but show appreciation of the fact that present day tanks are much faster than those used in 1918. Information on foreign fighting machines has been collected and published. Details of the American T1 E1 model 1927 light tank were published in Germany and Austria when all matters pertaining to this machine were considered confidential in our own service. Specific data on weight, dimensions, speed, crew, armament, armor, vulnerable points, and other characteristics, with photographs and diagrams drawn accurately to scale, are being circulated among those in the military service. Military writers have made exhaustive studies of fighting machines and their tactical uses, and have published several books on the subject. As a result of this laborious research and of encounters with tanks in 1917-18, the Germans have evolved carefully considered methods of antitank defense. *They have changed their combat organization, equipment, and training to meet, as best they can, the new conditions imposed by tanks.*

The combined use of tank obstacles and antitank fire is the basis of their present defensive tactics. Artificial obstacles such as trenches, traps, barricades, palisades of posts or rails, and mine fields are considered; but their value is heavily discounted on the ground that there will seldom be enough time or labor available for the necessary construction. Strong emphasis is placed upon the election of defensive positions which are protected from tank attacks by marshes, water courses, thick woods, precipitous slopes, or large boulders; even

though the resulting position sacrifices important features that would be desirable for defense against troops that have no tanks. Antitank weapons, organized in depth in conjunction with defensive machine guns, form the real basis of the defense.

The weapons to be used are as follows: Infantry rifles with armor-piercing ammunition; minenwerfers; flame throwers; caliber .50 machine guns with armor-piercing ammunition; automatic and semi-automatic infantry cannon of 20-mm., 37-mm., and 57-mm. caliber, with high velocity ammunition and wide traverse; 77-mm. guns, horse drawn; 77-mm. guns, mounted in automobiles. Some of these weapons, particularly the heavy machine guns, are designated as special antitank guns; they are to be camouflaged and remain inactive until hostile tanks appear.

Infantry is trained to fire on enemy troops until hostile machines are within comparatively short range and then concentrate their fire on the eyeslits of the machines. Artillery training includes much practice in direct fire on moving targets. A horse drawn battery of six 77-mm. guns, primarily for antitank defense, is assigned to each infantry regiment. In each infantry division, there is a battery of four 77-mm. guns, mounted on automobiles, whose duty it is, in cooperation with infantry cannon and horse drawn 77's, to destroy with direct fire at short range enemy tanks that penetrate the defensive position. Mobile fire units to supplement the fixed defenses are considered highly essential. Both passive and active antitank measures that can be carried out with available means are to be fully utilized. German military leaders keenly appreciate the combat value of the tank. They have already done everything that they can under present conditions to neutralize its power, and by so doing have prepared all ranks for changes that may come in the future.

The Organization and Employment of British Antiaircraft Artillery

By LIEUT. JOHN R. BURNETT, C. A. C.

LITTLE or nothing had been done before the World War by any of the leading powers in developing antiaircraft defense. It was only a short time, however, after the entrance into the war that we find all participants actively engaged in developing antiaircraft materiel and training personnel in its use.

The early efforts were, naturally, the attempt to modify existing Field Artillery materiel for antiaircraft use by giving it greater elevation; and these improvised weapons were manned by Field Artillery personnel. It was soon apparent, however, that the firing of antiaircraft guns against aircraft, whether they be machine guns or guns of greater caliber, was a very different matter than firing against ground targets—they required differently constructed mounts and specially instructed personnel; also, that Field Artillery is needed for ground fire at the same time that antiaircraft fire is most needed—normally during an attack.

Very soon, therefore, we find the organization in the armies of all powers of special troops for antiaircraft defense. The developments proceeded in all countries along very similar lines—machine guns for low, fast-flying planes and guns of varying larger caliber for targets at greater altitudes.

So in December, 1916, we find the British with one Antiaircraft Group in each Army. A "Line of Communication" Antiaircraft Group was also formed, divided into antiaircraft areas under the Group Commander. This organization remained until the end of the war, but antiaircraft batteries, in practice, contained varying numbers of sections according to the needs of the moment.

Now before proceeding further with the discussion of the British Antiaircraft Service we must study its organization, because in point of organization the British, since the war, have moved in a direction so radically different from our own service that it is startling.

In our service we find the problem of antiaircraft ground defense (if we neglect that local defense of other arms against low-flying planes provided for by antiaircraft machine guns, which are part of their equipment and manned by their own personnel) is assigned to the Coast Artillery. And our antiaircraft artillery, within the Coast Artillery, comprises all means of antiaircraft defense, including guns, machine guns, searchlights, and all auxiliaries pertaining thereto.

This is not so in the British service. In that service all artillery, both Field and that which we term "Coast," is grouped under one head and command, the Royal Artillery. And in the British Army only those antiaircraft organizations

manning guns are assigned to the Royal Artillery. The searchlight organizations are part of the Royal Engineers; while the signal communications for the anti-aircraft defense are provided for by Anti-aircraft Signal companies which are part of the Royal Signal Corps.

You will notice that no mention of machine-gun organizations is made. This is because the British Anti-aircraft Service contains no such units. Troops in the field will furnish their own machine-gun protection, the anti-aircraft units using machine guns as secondary weapons. In our service, a machine-gun battalion is contained in each anti-aircraft regiment. In addition, each unit of the other branches of our service is equipped with anti-aircraft machine guns for local defense. As a means of drawing a comparison of the efficiency of the machine-gun defense in the two services, let me mention our experience in the World War. The first American anti-aircraft machine-gun unit arrived at the front August 1, 1918, and at the signing of the armistice there were two battalions on the front, operating ninety-six machine guns, and they had in so short a time accumulated *forty-one planes to their credit*. It has been estimated that there were 1500 other machine guns for anti-aircraft purposes assigned to other units of our army. So far as has been officially reported but two planes were shot down by these other guns. The contrast tells its own story.

It might be of interest to note that the standard anti-aircraft machine gun of the British is the Lewis machine gun which is fired from the shoulder. Controlled fire for machine guns has not been attempted except for production of two four-gun multiple mounts, mounting .303-caliber Vickers machine guns. These have not been tested yet.

Now to consider the strength of the various anti-aircraft units.

An anti-aircraft brigade consists of a brigade headquarters and three gun batteries. Each battery is divided into five sections—the first four sections are gun sections manning two guns each. The fifth section mans four Lewis machine guns used for close defense of the battery against low-flying planes, *i. e.*, one machine gun for each section—which is certainly insufficient defense for four two-gun units.

Now, as just stated, the British battery mans eight guns divided into four sections, and each of these sections is a fire unit containing besides two guns and the necessary range and fire-control apparatus. In other words, as organized, this British battery is in reality a battalion of four batteries of two guns each, and furthermore it is employed, tactically, as a battalion would be, and is commanded by a major and not a captain.

In a brigade, two of the batteries man 3-inch 9-cwt. guns mounted on lorries or trucks which transport the gun to the firing position. Arriving there, I beams are placed under the lorry carriage and, by means of screw jacks, are jacked up until they carry the weight of the carriage and guns.

The third battery mans 3-inch 20-cwt. guns mounted on traveling platforms which are drawn by tractors.

Again it might be of interest to note that the British have adopted the Vickers Director for anti-aircraft gun fire for use with Case III fire. This director is

almost identical with the Vickers Director tested by our service at Aberdeen, Maryland, last year. With this director is used a 15-foot base height finder of the coincident image type. The British do not look with favor on an anti-aircraft gun of greater caliber than the three inch. Also, their present guns are of a low muzzle velocity, around 2000 f. s. In 1927 they tested guns with a muzzle velocity of 2600 f. s. but it was found that the life of the barrels was never more than 1500 rounds. Due to the short life of the gun the war office refuses to approve the new models until some means were devised to increase their life.

Each Searchlight Battalion consists of a Battalion Headquarters and four searchlight companies. Each searchlight company is equipped in peace time with twenty-four searchlights divided into four sections of six lights each. In war time it is equipped with forty-eight lights divided into eight sections of six lights each. We will consider their employment later in this discussion.

The latest type searchlight in the service, and which has been adopted as standard, is a barrel type light, 150 amperes, 75 to 80 volts, 90-cm. (about 36 inch), paraboloid reflector, and delivering 250 million candle power. But this is transported on and the power generated by an obsolete type of truck which is a relic of the last war. This, when carrying the light, its equipment, and a crew of 12 men, is very greatly overloaded. Also, very little progress has been made in the location of planes at night by sound-locating apparatus.

The remaining anti-aircraft unit is the anti-aircraft signal company. This is composed of seven sections. The first two sections are attached to the anti-aircraft brigade headquarters, the next four sections accompany the four searchlight companies of a searchlight battalion. The 7th section is a cable section. An additional cable section is added in time of war.

And now we come to the combination of all the various anti-aircraft agencies for defense. The first unit containing all means of anti-aircraft defense is the anti-aircraft defense brigade. This consists of the following:

- 1 Air defense brigade of one or more air squadrons, each squadron consisting of 24 combat planes.
- 2 Anti-aircraft brigades, R. A.
- 1 Anti-aircraft searchlight battalion, R. E.
- 1 Anti-aircraft signal company, R. Sig. Corps.

Again we see a radical change from our own anti-aircraft defense. Here we have the air service and the anti-aircraft service, not separate and cooperating with each other, but rather joined together and working under a single commander—the Anti-aircraft Defense Brigade Commander.

And the anti-aircraft defense brigade is always employed as a unit in the defense. For home defense it is assigned an area to defend. In the field all defense brigades are assigned to G. H. Q. and by G. H. Q. are assigned to armies or to rear area defense. Never is a brigade broken up into smaller units and attached to Divisions or Corps, thus insuring unity of control and defense throughout large areas.

The general proportion of anti-aircraft units in the field to the force in the field will be one normal anti-aircraft brigade to two infantry divisions. Here we might draw a comparison between the amount of anti-aircraft defense provided at the front in our service and the British service:

Taking the British service first, let us work on the basis of twelve divisions on the front. With the ratio of one anti-aircraft defense brigade to two divisions, this will give us six anti-aircraft defense brigades. Neglecting the air force and the signal troops, we find that six anti-aircraft defense brigades comprise twelve anti-aircraft brigades manning twenty-four guns each. This gives us a total of 288 guns. Also, six anti-aircraft defense brigades will contain six anti-aircraft searchlight battalions, or twenty-four searchlight batteries, manning forty-eight searchlights each, giving us a total of 1152 searchlights.

Now to consider our own service. Let us take twelve divisions again which would normally be divided into four corps. Each corps has one anti-aircraft regiment as part of the corps artillery. An army, normally of three corps, has three anti-aircraft regiments as Army artillery or one regiment per corps. So for our four corps we can expect four anti-aircraft regiments in the Army Artillery. Now the anti-aircraft artillery assigned to G. H. Q. is an uncertain quantity. But in the hand book, *Tactics and Technique of Artillery*, we find the statement that for six field armies or eighteen corps, G. H. Q. will have eighteen anti-aircraft regiments or the ratio of one anti-aircraft regiment to a corps. If we take this as a basis we have then four anti-aircraft regiments in G. H. Q. artillery for four corps at the front. Totalling all these we find that for four corps at the front we will have twelve anti-aircraft regiments, and these twelve regiments man 144 guns and 144 searchlights.

Comparing these figures we find that for the same number of divisions on the front the British will have twice as many anti-aircraft guns as our troops would have (organized into four times as many firing units) and eight times as many searchlights.

This superior fire power can be reduced quite a lot in the consideration of low-flying planes when we recall that our anti-aircraft regiments contain machine-gun battalions, which, armed with .50-caliber machine guns, will have an enormous fire power even up to medium altitudes, not to mention 37-mm. anti-aircraft guns that are being tested and will undoubtedly be in use soon.

But the difference in the number of searchlights in the two services is startling. The reason for this might be partly understood by considering the employment of the British searchlights. The British do not assign platoons or sections of a searchlight battery to a gun section or battery. Instead, they locate searchlights over an entire area in such a manner as to cover all approaches and insure the illumination of the target during the entire time it is over the area. Furthermore, the British have gone deeply into the question of night defense by aircraft aided by searchlights, and a goodly number of the searchlights in the searchlight battalion will be assigned to the air brigade for use with planes for night air defense. The effectiveness of such night defense is well shown by the fact that a special British organization of fifty-six searchlights and

twenty-six pursuit ships, between Cambrai and St. Quentin, destroyed twenty German night bombardment planes during the summer of 1918.

And, lastly, we might mention the peacetime anti-aircraft establishment. At the present time the following anti-aircraft units are maintained (excluding the air service)

Two anti-aircraft brigades, one of which has just recently been organized and equipped.

One anti-aircraft searchlight battalion, R. E.

One anti-aircraft Signal company.

In addition, a school of anti-aircraft defense is maintained at Biggins Hill, Westerham, Kent. The school consists of the artillery wing (anti-aircraft artillery school) and the Engineer wing (anti-aircraft searchlight and sound locator school).

Besides these regular army establishments there are also three territorial anti-aircraft brigades. The territorial brigades are equipped and organized similarly to those of the regular army. In time of war the regular army units would be dispatched to the front and the defense of the British Isles would devolve upon the territorial units.

The anti-aircraft brigades both regular and territorial hold target practice each year at Watchet Hill on the south side of Bristol Channel.

The remaining units of the anti-aircraft defense, including the air forces, searchlight units, and signal units, as a culmination of the annual training year, engage in a series of exercises known as the annual air force maneuvers. These are maneuvers extending over several days in which the defensive combat units of the air force, aided by the searchlights at night, try to defend a certain area of England, usually that near London, from simulated attack by bombing planes. And in closing we might draw the following conclusions with respect to our anti-aircraft service and that of Great Britain.

(1) In general, in technical development we are probably far ahead of Great Britain, (2) in tactical principles we are on a parity, (3) in the conception and execution of a combined defense they are probably ahead of us due to the experience gained in the annual combined maneuvers.

The Atlanta Campaign

By CAPTAIN E. W. HILL, A. C., and CAPTAIN L. D. FARNSWORTH, C. A. C.

THE opening of the year 1864 found the Union controlling the Mississippi River over its entire length, thus severing the great southwest cattle country from the Confederacy. The Arkansas River was under control of the Union and an expedition was operating on the Red River to tighten the grip on this southwest country. The Atlantic and Gulf ports of the Confederacy, if not actually in the hands of Union troops, were blockaded by Union vessels to prevent Southern cotton reaching Europe and European war supplies reaching the Confederacy. The northern limit of Confederate control was practically along the southern boundary of Tennessee, the southeast boundary of West Virginia and the Rapidan River through old Virginia.¹

Guarding this northern line, the Confederates had two major groupings of forces; one under Joseph E. Johnston at Dalton, Georgia, south of Chattanooga, covering Atlanta, and one under Lee on the Rapidan River, covering Richmond.

In March, 1864, General Grant was made a lieutenant general and placed in command of all the Union armies. His general plan of operations for 1864 was for concerted offensives on all fronts from the Mississippi to the Atlantic and by continued pressure, to defeat the Confederate armies and drive them back on their bases, at the same time constantly narrowing down the territory supplying those bases.²

His plans called for two major thrusts into the Confederacy. The Army of the Potomac, under Meade but closely watched by Grant himself, was to drive Lee's army on Richmond, while Sherman, with the armies of Cumberland, Tennessee, and Ohio, was to drive Johnston on Atlanta, cutting deep into the Confederate zone of the interior. Two minor thrusts were planned, one to be by Butler along the south bank of the James River, on Petersburg and by the rear on Richmond, and one by Sigel up the Valley of Virginia on Lynchburg. All offensives were planned to start concurrently as soon as roads opened up in the spring of 1864.

In conformity to Grant's plans, Sherman, during April, 1864, concentrated and prepared his armies in the vicinity of Chattanooga. The Army of the Cumberland, under Major General Thomas, consisting of three infantry corps, a total of nine divisions, and one cavalry corps of three divisions, in all a total of 60,700 men, were concentrated near Ringgold. The Army of Tennessee, under Major General McPherson, consisting of three infantry corps, totaling seven divisions, in all, 24,400 men, were concentrated at Gordon's Mill.³ The Army of Ohio, under command of Major General Schofield, consisting of one infantry corps of two divisions and one cavalry division, in all 13,900 men, were con-

¹Battles and Leaders, IV, 101.

²BL, IV, 97, 247.

³72 Rebellion Records, 62.

centrated at Red Clay—Sherman's combined forces, starting on the campaign to Atlanta, totalled 98,700 men and 254 pieces of artillery. Sherman said that a force of 100,000 men was approximated but never reached.⁴ An abstract from his returns, show effective strength varying from 110,000 on April 30 to 81,700 on August 31.⁵ The force left in the vicinity of Chattanooga to guard bases no doubt accounts for the discrepancy in numbers.

On May 1 Johnston had concentrated his forces in the vicinity of Dalton. His strength return of April 30 shows 63,777 aggregate present, of which 54,500 were carried on the return as present for duty. Between May 10 and May 20 he was reinforced by Polk's Army of Mississippi, which carried on its return of June 10, the item, effective total present, of 19,245.⁶ Johnston's effective arm-bearing force after the arrival of Polk, must have totaled at least 73,000 men. Johnston claimed he had only 44,900 men on May 1,⁷ Hood, his successor said that Johnston had on May 13 and 20, 70,000 effective arm-bearing men in excellent condition.⁸ Johnston's force was organized in three corps of about equal strength, under command of Generals Hardee, Hood, and Polk. His cavalry numbered about 10,900 effective. His attitude at Dalton was defensive. His force, less that of Polk, under command of General Bragg, had been defeated in the fall of 1863 at Chattanooga.

Sherman started operations in the direction of his objectives, Johnston's Army and Atlanta, on May 4.⁹ From May 7 to 10 he demonstrated in front of Dalton with the Armies of Thomas and Schofield, while McPherson marched through the mountains on Resaca, 15 miles south of Dalton, and on Johnston's communications. McPherson found Resaca fortified and defended. He attacked, but, failing in his first attempt to reach the railroad, he retired to a defensive position across Snake Creek Gap. Sherman now moved the armies of Thomas and Schofield from in front of Dalton, and concentrated them in front of Resaca, west of Snake Creek Gap, by May 12. Johnston, executing a flank march, withdrew his forces from Dalton and had them concentrated at Resaca by May 13. Johnston left Dalton later than Sherman and marched parallel to him, but was protected in the flank march by a parallel range of mountains. The difficulty of passing his forces through the one gap in these mountains prevented Sherman from deploying in front of Resaca before May 14. Johnston took up a position facing west, his line running parallel to the railroad and his communications. His left rested on the Ooastanaula River. It appears that an opportunity was presented here to drive Johnston to the east and off his communications. No general attack was made. Pressure was placed against the line on the fourteenth and continued on the fifteenth, while a division of infantry and a division of cavalry was sent across the Ooastanaula southwest of Johnston's left flank, threatening his communications. Johnston retired across the Ooastanaula on the night of the fifteenth and burned the bridge.

⁴72 RR 62.

⁵72 RR 117.

⁶74 RR 677.

⁷74 RR 614.

⁸74 RR 636.

⁹72 RR 61; 74 RR 612; IV BL 293; 74 RR 16.

Johnston retired, during the next three days, across the open, rolling country between the Ooastanaula and Etowah River. Sherman crossed the Ooastanaula and pursued on a broad front, at the same time dispatching a cavalry and infantry force to capture Rome, an important manufacturing and storage center at the terminus of a branch railroad extending twenty miles west of the main line to Atlanta.

At Cassville, Johnston converged his columns and took up a position, disposing Polk's and Hood's corps to attack Schofield's column which was widely separated from Thomas and McPherson.¹⁰ Hood was well disposed to catch Schofield in the flank as he deployed to meet Polk. Hood, on receiving information that his right flank was being engaged, changed his front, thus causing delay and allowing time for Thomas and McPherson to close in on Schofield. Johnston, seeing the opportunity lost, retired his forces to a strong defensive position southeast of Cassville, covering the railroad crossing of the Etowah. On being pressed in this position by the three armies of Sherman, Johnston retired on the night of May 19 to the south side of the Etowah, destroyed the bridges, and took up an exceptionally strong position astride the Allatoona pass.

Sherman, familiar with the terrain in the vicinity of Allatoona Pass, knew that it would be difficult to attack Johnston there, so he decided to turn Johnston out of his position by a movement *en masse* on his rear.¹¹ A maneuver of this nature required Sherman to leave the railroad and to depend on wagon transport for supply. He accordingly took three days to rest his troops, reconnoiter, build pontoon bridges, and prepare for the movement. He loaded his wagons with rations for twenty days and on May 23 crossed the Etowah, west of Johnston's position, at six places, his columns, converging on Dallas, a town fifteen miles southwest of Johnston's position.¹² The terrain traversed was cut up by many hills and sharp ravines and was covered with a thick growth of timber and brush, with no clearings. Roads were few and of a most primitive kind. Under the traffic of so many troops and transport and the drenching of continuous rains, the roads became quagmires. The many columns interfering with one another resulted in much confusion. On May 26, in this wilderness, another obstruction was met in the form of Confederate breastworks, erected near New Hope Church. These breastworks were assaulted unsuccessfully and the advance of the army southward was halted. Johnston had shifted his forces from Allatoona Pass to a line through Dallas—New Hope Church and to the northeast. Due to the dense underbrush, the Union skirmishers could not locate the Confederate position, so Sherman shifted his armies to the left, endeavoring to find the Confederate right. Another attack on May 27, at a point five miles farther northeast was also stopped by Confederate breastworks. Sherman now tried to pass his right flank around to his left but his right was so hard pressed that it was deemed inadvisable to execute this maneuver.¹³ By constructing breastworks and moving his forces sideways behind them, Sherman finally got his left flank back on the railroad on June 6. Johnston, to avoid an attack on

¹⁰74 RR 612, 628.

¹¹72 RR 61.

¹²IV BL 293.

¹³72 RR 61; IV BL 293.

his exposed right flank, retired to a line: Lost Mountain—Pine Mountain—Brush Mountain and was once more astride the railroad and facing Sherman's armies.

Sherman now repaired the railroad bridge over the Etowah, moved his advanced base up to Allatoona, constructed blockhouses to protect the Allatoona Pass, and once more moved in the direction of Johnston and Atlanta.

For fifteen days, Sherman exerted frontal and flank pressure on Johnston's army, causing it gradually to shorten and withdraw its lines to a strong defensive line on Kenesaw Mountain. Here, Sherman had the choice of two plans; namely, to assault a strong defensive position or to make a turning movement by the right. To use the words of Sherman—"Either course had its difficulties and dangers and I perceived that the enemy and our own officers had settled down into a conviction that I would not assault fortified lines. All looked to me to outflank. An army to be efficient must not settle down to a single mode of offense . . . I wanted therefore, for the moral effect, to make a successful assault against the enemy behind his breastworks."¹⁴ Accordingly, an order was issued on June 24 for a general assault on the Kenesaw lines on the twenty-seventh. The assault was made with persistency and vigor but was repulsed with a loss of 3000 men of Sherman's army to a loss of 500 of Johnston's army. Sherman quickly started to outflank the Kenesaw position, for, as he said—"It would not do to rest long under the influence of a mistake or failure . . ."¹⁵ He set Schofield to operating on Johnston's left, constructing trenches and edging southward, at the same time replacing McPherson's force by cavalry on the line in front of Kenesaw, and sending him to the rear of Schofield and south to the Chattahoochee River, threatening Johnston's crossings and communications with Atlanta.

Johnston reacted to this maneuver by retiring from Kenesaw on July 3 to a prepared position at Symrna. Closely followed by Thomas, and his bridges over the Chattahoochee still threatened, he retired July 4 to a position covering the bridges. This position had previously been prepared and was strong enough to forbid attack.¹⁶

Sherman's armies now were disposed with Thomas immediately in front of Johnston's fortified position; McPherson to the south feigning a crossing of the Chattahoochee, and Schofield to the right and rear of Thomas, in reserve.¹⁷ Instead of crossing to the south of Johnston's position, Sherman moved Schofield rapidly to make a crossing ten miles to the north and moved McPherson from right to left in rear of Thomas and Schofield to make a crossing ten miles north of Schofield. These crossings were a complete surprise to the Confederates for they were lightly opposed. Pontoon bridges were necessary for all crossings.¹⁸

Johnston, learning of the lodgements made east of the Chattahoochee, retired to the Atlanta side of the river on July 10 and burned the bridges in vicinity of Atlanta. Thomas now moved to the north a few miles and crossed

¹⁴72 RR 68.

¹⁵72 RR 61.

¹⁶72 RR 61, 127; 74 RR 612.

¹⁷72 RR 127; 74 RR 612.

¹⁸73 RR 515.

the Chattahoochee with little difficulty, being protected from Johnston's army by the confluence of Peach Tree Creek at the Chattahoochee.¹⁹

Sherman's three armies now wheeled to the right and southward on a 25-mile front, closing in on Johnston and Atlanta.

On July 17, Johnston was relieved by a telegram from Richmond which placed Hood in command succeeding him.²⁰ Johnston's relief was due to dissatisfaction which had arisen because of his failure to prevent further invasion by Sherman.

By the evening of July 19, Sherman's armies were disposed as follows: Thomas's Army had wheeled right and was crossing Peach Tree Creek; Schofield's Army had marched to the southeast and was about to cross this creek east of Buck Head Road; McPherson's Army was approaching Decatur.²¹ These positions gave the army, as a whole, a huge front, leaving a large interval between Thomas's left and Schofield's right. Thomas attempted to close this interval by placing two divisions under Howard therein to connect with Schofield. This, however, left sufficient interval for Hood to attack Thomas's left as soon as he should cross the creek.²²

Using Cheatham's corps and some Georgia militia under Smith, with cavalry on the extreme right to hold Schofield and McPherson, Hood attacked Thomas's left flank on the afternoon of the twentieth. This attack was repulsed by Thomas.

Continuing the wheel on the twenty-first the Union Armies closed in about Atlanta. Hood withdrew to prepared intrenchments close around Atlanta. On the twenty-second, Thomas and Schofield, apparently misled into believing Hood had evacuated Atlanta, pushed forward toward Atlanta and McPherson started pursuit to the south and east of Atlanta.²³

Hood, however, attacked the Union left flank, using Hardee's corps and Wheeler's cavalry. Taking McPherson by surprise, Hardee rolled up McPherson's flank and captured Decatur. He was, however, repulsed.²⁴ In this engagement, the Battle of Atlanta, McPherson was killed and Howard succeeded to command of his army.

Since the Macon Railway was Hood's main line of supply, Sherman's next objective was that railway. On the morning of July 27, Howard marched his army to the right in rear of Schofield and Thomas, with the object of striking that railway below Atlanta. In opposition to this movement Hood sent Stephen D. Lee to cover the roads on the west of the railways. Coming unexpectedly on Howard at Ezra Church, he attacked and was repulsed.

The Cavalry had been ordered to strike the railway at Jonesboro from both sides. As Cavalry operations will be dealt with later in detail, it will suffice here to say that the cavalry did not carry out its mission.

While awaiting the results of the cavalry operations, Sherman was strongly entrenched but his line was drawn out for a distance of ten miles.

¹⁹74 RR 612; 72 RR 127.

²⁰72 RR 53.

²¹72 RR 71.

²²72 RR 306.

²³72 RR 72.

²⁴72 RR 73.

Before August 4, Sherman had received reports as to the failure of his cavalry in cutting the lines of supply.

Sherman decided to attempt to cut the railroad with the bulk of his main force, and orders were issued to carry this project into effect. This move necessitated the raising of the siege of Atlanta. The movement began on August 25, withdrawing units from the extreme left of the line to start. Continuing the move upon the Montgomery Railway, Sherman destroyed in detail twelve and one half miles of the railway.

Having made a personal inspection and being satisfied with the destruction, Sherman ordered the whole army to move eastward over several roads, with Howard, Thomas, and Schofield, approximately in line from right to left, the right moving on Jonesboro.²⁵

This movement was in the nature of a left wheel about Schofield. On the thirtieth, Schofield advanced toward Eastpoint covering the trains, while Howard and Thomas continued the wheel, meeting some cavalry opposition which was rapidly overcome. On the morning of the thirty-first, having met the enemy in force, Sherman deployed one corps, with a corps on each flank. Here Thomas took up a position in readiness.²⁶

Having received information as to the dispositions of Howard, Sherman ordered a general advance on the Macon Railroad. During this advance the enemy about Jonesboro came out of his trenches and attacked Howard, who, being on favorable terrain, repulsed the attack with heavy enemy losses. Late on the same day Schofield, Thomas, and Howard all hit the railroad, and with cavalry to the rear and north covering the lines of communication, Sherman ordered the armies to close in on Jonesboro, destroying the railroad as they advanced. Cavalry was sent south of Jonesboro to protect the right and seize the railroad there.

Sherman's desire was to attack and cut off the enemy lines of retreat but, due to the distance the northern elements had to travel and to the nature of the terrain over which they had to advance, they were unable to arrive on the same day. However, one corps under Davis, arriving in ample time, launched an attack with splendid success. Darkness prevented a coordinated attack and by morning the enemy had moved out to the south, evacuating Atlanta and positions near Jonesboro, and destroying their deserted trains and munitions. Having lost contact with the enemy Sherman took up a position in readiness awaiting information as to enemy dispositions.

Sherman received confirmation from Atlanta of the retreat and the taking up of a new defensive position at Lovejoy station by the enemy, and due to the difficult terrain he considered pursuit futile and withdrew to positions from Decatur to Eastpoint, with cavalry on the flanks and rear.

Due to the necessity of covering the Union prison at Andersonville, the Confederates were prevented from an immediate move and the Atlanta campaign was at an end.

²⁵72 RR 650.
²⁶72 RR 61.

The Cavalry in the Atlanta Campaign

By CAPTAIN E. A. VARONA, C. A. C.

AT the start of the Atlanta Campaign when General Joseph E. Johnston assumed command at Dalton of the Confederate forces, relieving General Braxton Bragg, his Cavalry was organized as a Corps which at the start numbered less than 2000 horsemen, commanded by General Joseph Wheeler.

The Federal Cavalry was, before the campaign opened, organized into four divisions which were assigned to duty by the Federal Commander-in-Chief, W. T. Sherman, as circumstances required, although nominally attached to the three subordinate armies, the Army of the Ohio, the Army of the Cumberland, and the Army of the Tennessee.

One division was usually on each flank and one covering the line of communications, while the fourth was ready for operations to the front, raids, and similar operations. The nearest subordinate Army Commander usually exercised authority over the cavalry cooperating with him.

The Confederate Army having taken a very strong position at Dalton, Sherman resolved to turn it, McPherson with the Army of Tennessee, preceded by Kilpatrick's Cavalry Division making the main blow or turning movement by the way of Villanow and Snake Creek Gap. Thomas with the Army of the Cumberland supported him by making a strong demonstration against Tunnel Hill and Rocky Face Ridge in front of the Confederate position. On the ninth, Schofield, with the Army of the Ohio, moved down from the north. E. M. McCook's cavalry division covered his left and was repulsed in a sharp dismounted skirmish with the Confederate cavalry under Joseph Wheeler at Varnell's Station.

A Confederate cavalry brigade was about to occupy Snake Creek Gap, where it was defeated by the Federals under McPherson.

When General Sherman moved his whole Army to Snake Creek, Stoneman's cavalry division was left to cover his line of communications.

The movement of the Federals and concentration was known to General Johnston by the skilful reconnaissance made by Wheeler, who moved his cavalry around the north end of the Federal position and, driving back the Federal cavalry, located the flank.

When General Johnston, on the morning of May 13, withdrew to Resaca, he was followed by Stoneman's cavalry. There he intrenched his position. Kilpatrick's cavalry division and an infantry division crossed Oostanaula by pontoon bridge at Lag's Ferry, five miles southwest of Resaca, the cavalry advancing upon Calhoun.

At the same time Garrard's cavalry division marched from Villanow by the way of Rome to break up the railway between Calhoun and Kingston in the rear

of the Confederate forces. The cavalry, by its mobility, threatening the Confederate rear and lines of communications, played an active part in forcing Johnston to withdraw from Resaca.

At Adairsville on May 17, General Johnston's army was reinforced by 3700 cavalry under W. H. Jackson.

In the pursuit of Johnston's army, the cavalry supported Davis's division in the operation against Rome. The cavalry marched on both flanks of the advancing Federal Army trying to reach the rear of the Confederates.

On the retreat from Adairsville to Cassville the role of the cavalry on both sides was reconnaissance mainly.

During the turning movement of Sherman on May 23 of Johnston's entrenched position in Allatoona Pass, the cavalry covered the left, right and center, and rear of the Federal advancing forces, screening the turning movement. Johnston, finding his position about to be turned, withdrew under cover of his cavalry to New Hope Church; but Sherman's army was able to drive back the Confederate cavalry and to locate the Confederate position.

During these operations the Union cavalry captured Allatoona.

In his new position from Lost Mountain, Johnston had Wheeler's cavalry guarding his left and Jackson's his right.

In Sherman's operation against the Confederate position between June 28 and July 3, the Federal cavalry under Stoneman reached the Chattahoochee near Sandtown.

In Johnston's retreat to Smyrna on July 7, Garrard's cavalry seized Roswell.

About this time a Union cavalry force under General Rousseau was organized at Decatur, Alabama, for a raid. This force destroyed about twenty-five miles of the Montgomery and Atlanta Railway, one of Johnston's main lines of supply. Marching on Marietta they arrived there on July 22.

In the battle of Peachtree Creek, the first battle in which General Hood commanded the Confederate army, Wheeler's cavalry was on the extreme right of Cheatham's corps with the mission of holding off Schofield and McPherson on July 20.

On the twenty-first, Garrard's cavalry (Federal) was sent to destroy the railway from Decatur toward Atlanta.

When, on July 21, Hood withdrew from his position behind Peachtree Creek into intrenchments already prepared close around Atlanta, the Federal Army was in pursuit, but Hood counterattacked, assaulting the left of the Union line with Hardee's corps supported by Wheeler's corps, which gained a position on McPherson's flank and rear. This engagement is known as the Battle of Atlanta.

By July 25, the Federal Army occupied an entrenched line stretching from a point south of the Georgia Railroad and east of Atlanta to a point beyond Atlanta to the northwest. Hood's main line of supply was the Macon Railway. Sherman's next objective was to be the railway. His plan was to send all the cavalry around by the right and left to make a lodgment on it about Jonesboro; the cavalry was assembled in two strong divisions: that of McCook, including

Rousseau's brigade, to the right rear, at Turner's Ferry; that of Stoneman to the left rear, near Decatur.

Stoneman attacked Macon on July 30, was repulsed, and later was captured, instead of obeying orders in cooperating with the other cavalry column in making a lodgment on the railway near Jonesboro.

McCook was defeated on the thirtieth by a part of Wheeler's cavalry, losing 500 men and his artillery. He withdrew to the rear of the army and Kilpatrick's cavalry division took his place on the right of the army.

General Sherman was convinced by the failure of his cavalry raids that the cavalry alone could not make a sufficient lodgment on the railroad below Atlanta, proving that cavalry raids cannot effectually destroy the communications of an army in its own country; but taking advantage of the absence of Wheeler's cavalry, which had been raiding the Union communications as far as Dalton and causing considerable damage, he sent Kilpatrick's cavalry against the railway at Jonesboro, in the hope that the operation would force Hood to evacuate Atlanta. The raid did not accomplish very much; Kilpatrick got off on the night of August 18 and returned on the twenty-second, having made the complete circuit of Atlanta, but failed in his mission.

In the final operations on August 30, the Confederate cavalry screened Hardee, who, with about half of Hood's army, was dispatched by Hood to attack the Federal army, being repulsed.

During Hood's retreat from Atlanta on September 1, to Lovejoy's Station, the cavalry covered the withdrawal.

More than any other country in the world, America is the melting pot of mankind, and it should be fully realized that we must actually assimilate all divergent elements if we hope to fulfill the glorious promise of our past. In this work, it is particularly important that we improve the national physique, teach the national tongue, and aim at unified national ideals.—Gen. John J. Pershing.

Panics

By COLONEL GEORGE RUHLEN, U. S. A., Ret.

Extracts from the *Militär-Wochenblatt*

LEUTENANT General von Altrock, the editorial director of the *Militär-Wochenblatt*, contributes to the September 18, 1928, issue of that journal an article on panics in which he says that panics have, from time immemorial, been a frightful episode that appeared unexpectedly, and in most cases inexplicably, to influence events. Just as, according to ancient saga, the herds were brought to a senseless frenzy by the god Pan of flocks, masses of men frequently fall into panics in peace and in war. As long as nerves exist there will be panics. It is therefore incumbent on the soldier to take note of and concern himself with the nature and substance of panics and with measures for their mastery. While improvised and inadequately trained troops are naturally more subject to panics, the history of wars shows that the best troops occasionally give way to destructive and stupefying incidents of war that give rise to panics, especially at the beginning of campaigns, but cease entirely or at least occur very rarely, and then only under most extraordinary circumstances, after troops have become inured to war conditions in active campaign. Panic plays an important rôle in war history of all ages. The combination of incidents that led to a panic were usually imaginary or at least immeasurably exaggerated.

The editor of the *Militär-Wochenblatt* also takes occasion to invite the readers of the journal to contribute to it brief descriptions of incidents involving panics that have come within their personal experience and observation and of their origin, causes, and consequences and of the measures that were taken to overcome them. General von Altrock is of the opinion that the ten years' interval since the close of the war justifies the assumption that incidents about which one has been silent can now be talked about. He also holds that it is now a question of familiarizing the younger generation of military men who are as yet without war experience with the nature and substance of panics, the circumstances that gave rise to them, and the means taken to suppress them. Measures for quelling panics will in future, as has occurred in the past, be an important function of every officer.

Issues of the journal that have appeared since this invitation was issued indicate that its readers have responded to the invitation and their contributions are not only interesting but instructive. Selection has been made of some of the more important of these communications, a synopsis of which is here given in translation beginning with those contributions of General von Altrock himself in the issue of the journal containing his invitation.

An Historic Incident from the Battle of Jena. In the evening of October 14, 1806, the Prussian troops under Prince Hohenlohe, who had stood up during the day in solid mass against the French and had been disastrously defeated by the French artillery and then dispersed by the cavalry, were in senseless flight from Jena toward Weimar. Gneisenau, who was then a young subordinate officer attached to Blücher's staff, endeavored in vain to stem the wild rush but was carried along with it. But the lesson he learned on that occasion of the nature and course of panics came to him in good stead some years later when, after the defeat of Napoleon's army at Belle Alliance in June, 1815, he, as chief of staff of Blücher's army, was charged with the pursuit of the fleeing French forces. He repeated the tactics that had been employed by the French at Jena and sent his cavalry not only after the defeated enemy but also along their flanks where he placed mounted buglers and drummers and had them follow the French during the night without cessation and succeeded in disintegrating and dispersing them to such an extent that the army as such was broken up and very few succeeded in reaching Paris.

In the Campaign of 1812 of Napoleon's army invading Russia there were many examples of panics. The staff of the French Marshal Davoust, composed largely of German officers, while passing through Poland was quartered for the night in a manor house belonging to a local land magnate. These buildings were usually surrounded by a strongly built stockade of vertically set wooden stakes with an opening through a gate on one side only. The house was opposite this entrance, with a large veranda in its front at the level of the ground. The Marshal and his staff were assembled on the veranda when suddenly there rode through the gate a Russian force of about 100 Cossacks with loud yells. The officers rushed precipitately to the upper floor of the house but the Marshal remained standing on the veranda and addressing a sentinel armed with a musket who was standing by in helpless fright said to him: "*Tirez donc.*" The sentinel discharged his musket and no sooner was the shot heard than the Cossacks, with renewed yells and firing of guns, rushed out through the gate as precipitately as they had come in. When the officers began to apologize for their headless deportment the Marshal replied quietly: "In youth something like this is very liable to occur. I have found, however, that there is no situation that cannot be improved by a quick decision."

The panic of a Prussian Line Cavalry Regiment in the Campaign of 1866 is well known. While the regiment was in march in column on a road to the front it was believed that shots were heard in the immediate vicinity coming from the flank. The regiment turned about and began marching to the rear. The movement increased from a walk to the trot. The officers riding along the flanks increased their pace to a gallop in order to reach the heads of their units. This gallop was at once taken up by the troops and soon resulted in a wild and senseless flight which the officers were unable to control until several miles had been passed over. In their precipitate rush to the rear the regiment encountered a battery that had been following them on the road, and ran through it causing

much damage. Later on it was found that the imaginary sound of firing that had caused the panic was due to the sound of withes and straps with which an adjacent cavalry regiment was dusting its saddle blankets.

The panic-saturated tone of the community, including some of the military contingents, that prevailed at the beginning of the war is well known. Phantom "gold autos," on which it was said the French were sending gold to Russia, were being officially and privately pursued and in numerous cases ostensibly seen and fired upon. In Alsatia the passengers of many military autos that were endeavoring to proceed to their destinations on important service were fired upon and shot; similar fates overtook military officers and civil government officials in the Eastern sections of Germany. Arrests of officers on official journeys were frequent. It came to such a pass that no passenger on a motor vehicle was safe. At Strassburg telephone company employees working on the roofs of buildings were apprehended as French spies. Inasmuch as many of the new troops were being supplied with cartridges there was much reckless firing on the streets.

As an example of the excitement that prevailed in Alsatia the following is characteristic:

The fortified city of Strassburg was, even before war was declared, almost wholly denuded of troops before any war activities took place. As commander of the Sixth Infantry Brigade stationed in Strassburg I was summoned hastily, late in the evening of August 1, 1914, to general headquarters and found the staff of general headquarters and of the local government assembled in full force. They presented to me two despatches. One from the commander of the frontier guard in Breusch valley sector read: "Strong enemy forces of all arms are approaching from Schirmeck through Lutzenhausen toward Molsheim! (Signed) P., Sector Commander." Another was from Schirmeck from Captain I, Infantry Regiment 143 (the most advanced guard company in Breuschthal), which read: "Have just set fire, according to orders, to the wood encampment buildings at Schirmeck." (Instructions had been given that this place should not be allowed to fall into the enemy's hands.) If the first despatch was correct Strassburg was menaced; there was there then only one battalion of infantry and two companies as garrison of the fortress. The first despatch appeared to me to be erroneous because Captain I, of infantry regiment 143, could hardly set fire quietly to the camp at Schirmeck if the enemy advance reported in that despatch was actually in progress. But it was signed by the superior commander at Breuschthal and the section of fortress K. W. II of the city was exposed to the enemy. I was accordingly directed by the commanding general to proceed by rail with a part of my command with the last force remaining in Strassburg, from Strassburg to Lutzelhausen. The battalion embarked at about 10:00 P. M., with the locomotives and tender armed with riflemen and a bugler. On arriving at Molsheim the station superintendent wanted to stop the train from going further because "all railway defiles for at least 20 kilometers were undermined." The officer in command inquired of the station at Heiligenberg:

"What kind of mines were those and who had placed them?" Reply: "Our engineers, because the French are approaching." At the same time the fortress section K. W. II wired: "All available troops are to proceed at once to fortress K. W. II. The fortress is being pressed hard by the enemy and is unable to hold out. (Signed) K." That was evidently nonsense because we were then standing directly below the fortress and heard no kind of fighting noises. The battalion commander therefore declined to send his command into the fortress. A captain of the 136th infantry regiment who had brought the despatch declared that he would go up into the fortress with his command. But since his company was guard to the armored train stationed at Molsheim the officer in charge of the armored train asked him to replace the train guard at once. The battalion commander then advised him to follow his (the general's) own unarmored train and he would be safe there. The order was then given: "The train runs to Lutzelshausen without stopping." Orders were given to the bugler on the locomotive to sound, in case of attack: "Forward, double time," upon which signal all were to attack in direction of the enemy fire. But we arrived at the outskirts of Lutzelshausen without being disturbed. At the telegraph station the battalion commander had copies made of all telegrams passing through and experienced samples of all the fables of 1001 nights, for instance: "The little Donon has just been captured by the enemy." A field outpost west of Lutzelshausen reported: "I have drawn back because being attacked on both flanks I was unable to hold out." Inasmuch as there was total absence of any casualties the highly imaginative detachment commanders concerned were peremptorily ordered back to their posts and had their attention invited to the articles of war.

Cause of the mass delusion that had taken possession of the whole Breuschtal valley was as follows: a number of "know it all" frontier customs officials, who had listened to fabulous rumors of enemy forces approaching and having been seen in the valley, had rushed back from the frontier with excessive speed in their automobiles and spread these rumors with the usual additions at every station on their route and further claimed that the enemy were following directly behind them and the officers in charge of the frontier outpost and of section fortress K. W. II had accepted these rumors without investigation and without even inquiring into their source. As an actual fact it turned out that the enemy had some days previously drawn back ten kilometers from the frontier and on the day of this commotion was not anywhere nearer than that from our stations and had displayed no disposition to attack.

Heavy-firing panics occurred almost nightly during the first month of field activities at the beginning of the World War in the west. One of the worst happened on the day of our first touch with the enemy on August 9, 1914. The Seventh Army was in march southward in southern Alsatia toward the Swiss frontier. The 30th infantry division was advancing in the direction Meihenheim—Ungersheim—Ballweiler toward Wittelsheim. Very few rest stops on the route had been indicated in the corps marching order in the prevailing August heat. The XV Corps order was generally: "The march will go on

through without interruption; whatever falls by the way remains." Thus there occurred heavy marching casualties and the men were subjected to the utmost physical and nervous strains. Safety of the valley of Thann, against which the enemy had sent out feelers, had been placed in my charge, for which I posted a small guard on a height between Sennheim and Wittelsheim. The enemy attacks were easily repulsed. The bulk of the 30th infantry division was in bivouac at Wittelsheim. From the height mentioned we perceived that, to all appearances, hell had broken suddenly loose in Wittelsheim. A fire of infantry, artillery, and machine guns was raging and brilliantly lighting up the village in flashes. All were apparently firing like maniacs in every direction and alarming noises of firing sounded from all sides. An advanced guard battery had arbitrarily faced about and was beginning to lay a scientific line of shrapnel fire over Wittelsheim; it changed direction at once toward Thann. We were under the impression that the VII French Corps had possibly advanced towards Wittelsheim from the direction of Mühlhausen and we prepared ourselves to intervene. Then there was heard, after about a half-hour interval, the signal: "Cease firing" and the "Assembly." The ghost was laid but only after very material losses and casualties had been incurred, among them one regimental commander. This was the first firing panic that we experienced. The causes that gave rise to it have never been satisfactorily explained.

On the night of August 21-22, 1914, a replacement brigade assigned as auxiliary to the 60th infantry brigade, which had for the first time come in touch with the enemy, began, while in bivouac in a forest at night at Alberschweiler, suddenly firing insanely in all directions. I called out to officers whom I was able to reach to make utmost and continuous use of their drill service whistles and we thus succeeded in silencing the concert but only after thirty-four men had been killed.

Thus far the examples of panics are cited by General von Altrock. Those which follow are extracts from some of the articles contributed by readers of the *Militär-Wochenblatt* who responded to the invitation published in the issue of October 11, 1928.

* * * * *

The Battle of Specters. By Colonel von Notz, German Army, Retired. Almost at the same time as the occurrence of one of the worst cases of panic alluded to in General von Altrock's narrative—that of August 9, 1914, in Alsatia—there occurred a similar instance at the uttermost eastern section of the German domain in the night of August 7-8, 1914, when the Eight German Army was being mobilized for the defense of East Prussia against Russian invasion.

A battalion and a battery were on the march eastward toward the German boundary where other troops had already been assembled. All at once a shot was heard. The prevailing darkness prevented any clear outlook. The infantry had time to arrange a fair deployment from the marching column but the battery unlimbered at once and went into action where it happened to be in the line and began a wild fire into the night. The excitement increased and the

infantry also began to shoot, but at what! No one knew; no one could see anything! Rumors began to buzz about: "Strong enemy cavalry has broken through" and "Two gray-horse Russian squadrons were seen in our rear." The blindly raging fire began to inflict casualties in our own ranks, especially among the battery horses. Wounded draft horses ran away wildly through the streets of the village which the troops had just left, spreading the panic to the trains of supplies following the command. The drivers of the trains lost their heads and fled in every direction. General order was gradually restored, although other troops on the way had been drawn away from their line of march and had lost valuable time.

Subsequent investigation indicated that not even small enemy patrol detachments were or had been anywhere near in this region at the time. A shot had been fired, but it was traced to an awkward member of the local railway station guard who did not know how to handle the firing mechanism of his rifle.

The Reverse of the Foregoing. An occurrence in the same region which happened a few days later is an example of conditions where the influence of a *man and perfect soldier* is exerted and felt. His iron will has been transmitted to his command. It was the 8th to 9th of August, 1914, when the Eastern boundaries were beginning to be menaced by the Russian mounted squadrons standing near by, across the boundary, for invasion. The weak boundary defenses at the station in question consisted of the second battalion 147th regiment, two troops of the Second Dragoons, and four batteries of field artillery. Our reconnaissance parties reported at Biala, on the morning of August 9, an entire division of Russian cavalry advancing. The enemy had, in artillery alone almost double that of our own force, but the Germans advanced against them at once. The Russian artillery was soon broken down by the well directed fire of our own batteries. One enemy battery was entirely destroyed; another succeeded in escaping in part only. The Germans rushed forward to the assault and forced back and broke through the enemy line, capturing seven guns and many ammunition wagons. The officer in command of the troops engaged was Colonel Nitsch, who lost his life a few months later in an attack against Rawka in Poland. It may also be noted that the troops concerned in the debacle of the night of August 7-8 fought with distinguished bravery and endurance throughout the sanguinary six-day battle of Tannenberg from August 24 to 30, 1914.

The Influence of Drill on Panic. From the diary of Captain Stollberg, may I be permitted to recall an incident of my campaign experience that shows how a panic was overcome by adaptation of an expedient of the drill.

It was in 1916 during the sanguinary struggle against Verdun. After we had succeeded in shooting breaches into the north front we were brought down into the valley of the Meuse. We were to take station at the Forges water course even though the so called "Dead Man" commanding an outlook and oversight over the valley area was still in possession of the enemy. Warnings on my part in regard to this menace of our position were disregarded by higher authority. We went out under protection of a foggy morning and began to dig

in, building field fortifications and trenches. I was well forward at an observation station but went back to my battery in anticipation of trouble when the fog began to lift with the advancing sunlight. I had barely arrived there when a number of shots from enemy artillery began to puff over the depression of the valley. They were at once followed by a hail of bullets striking into the midst of our workmen at the entrenchments and well directed artillery shots began to fall incessantly into the midst of our position. Injured men were crying out and wounded men squirming on the ground. Words of command were given out but were unheard in the hellish noise that prevailed of cries, curses, oaths, and general confusion. Merciless bullets and artillery projectiles continued to strike into the bewildered and chaotic mass. By an instinct which I cannot yet account for I seized my service whistle and sounded on it a loud service call; the peculiar shrill call was heard above other noises and attracted attention. Drill had achieved its own. The call, heard hundreds of times in the barrack yard was heard and listened to; the confusion abated. Commands were given out and obeyed and the command was withdraw to near-by cover. Thanks to a momentary cessation of enemy fire we succeeded in bearing away our wounded before their fire began again with renewed fury.

Panics in 1914 and 1916. By Lieut. Col. Benary. The 28th Infantry had entered Mühlhausen in the hours of the afternoon of August 10, 1914. The division staff and the commanding general's staff were quartered in one of the large hotels on one of the principal streets; the staff of the 28th Field Artillery, to which I belonged, was in the Continental Hotel, at the railway station. Toward evening vigorous firing occurred suddenly in all parts of the city. My battalion commander and myself, suspecting a French attack, went at once to our division headquarters. We perceived, however, while still on the way, that it was a case of panic. Shots were coming from some of the houses; individual soldiers on the streets were firing off their rifles senselessly, mostly into the air. The firing gradually abated. A company of the 169th Infantry, led by company officers, marched through the streets of the city singing the national anthem and contributed by their dignified bearing much toward restoring order.

The causes of the panic have never been clearly and satisfactorily explained. One battery commander effectively silenced the tumult of firing in one of the suburbs where his battery was in camp by unlimbering a gun and firing a solid artillery projectile at and through a house from which shots had been fired.

A similar panic, that occurred at Lyck in East Prussia on October 14, 1914, was related to me in post-war times by an officer who was an eye witness of the occurrence. The 49th Reserve Division had taken the north fringe of the city on the evening of that day after severe fighting. The opponent had taken a new position directly south of the city on the Lyck river. While the reserve regiment 226 was engaged in driving the enemy out and continuing the attack in a southerly direction toward Syba, almost the entire remainder of the division was assembling on the extended area of the market place and the streets adjacent. When evening was setting in, all these troops were engaged in preparing their

evening meal and feeding their horses. Suddenly shots were fired from a house near a church and from the church itself. At the same time the fight near the southern end of the city was renewed. The troops believed that they had been subjected to a surprise attack and an abominable confusion set in. Firing began here and there on the streets, horses and teams ran away, the troops at the northern end of the city began to retire, and restlessness and confusion and disorder spread far to the rear among baggage wagons and supply team columns. Intervention of officers soon restored order in the city.

The Brusilow offensive in the summer of 1916 was a generous breeding place of wild rumors and sensations. Thus I barely escaped on one occasion the loss of all my guns because the Hungarian Honveds in position directly in my front had, on the cry: "Cossacks are coming," abandoned their places without firing a shot or notifying me of their intention and had made it possible for Russian cavalry to rush into my position from the rear before I could reach my guns. Fortunately, the Russians disappeared as rapidly as they had come on when, with the assistance of a Honved squadron that had held its place I opened fire upon them.

Two days later a Croat division repulsed the attack of a Russian cavalry division coming on in close order at early dawn. But in spite of this repulse the entire baggage and supply contingent stationed directly in rear of our first line ran away in wild disorderly flight and thereby broke down the wire connection between myself and my battery so that I could only stand helplessly by as a spectator of the fighting panorama.

The panic impression prevailing permeated also the German troops. The excellent rifle battalion of my division was put in as a relief of Austro-Hungarian units for counterattack but became involved in the general mess of the retreat in spite of brave resistance and heavy losses. The battalion commander, a brave elderly gentleman of the reserve, came riding up at full gallop to the division commander and reported: "Your excellency, I am the last survivor of my battalion!" The division commander, without change of countenance or of any gesture indicative of censure or reprimand, said to him: "You are mistaken, Major, your orderly is still with you." The brave old major recovered himself, turned about and rode back to his place as rapidly as he had come, collected his men, and succeeded in closing up the gap that had been formed.

EDITORIAL

Rotation of Officers in Battery Training

RECOMMENDATIONS are being made in certain quarters which, if adopted, will lead to the evolution of a system of rotation of battery officers among the various classes of weapons now being manned by the Coast Artillery Corps. In this connection, it is pointed out that there is even now a heavy demand for officers trained in the methods of fire of antiaircraft artillery and that this demand will be so greatly increased in the event of war as to prove decidedly embarrassing unless a greater number of our junior officers are given training in such methods. To a lesser extent the same embarrassment will be felt in railway, tractor, and fixed artillery and in submarine mining. It would therefore seem advisable to devise some method which would assure the training of battery officers in antiaircraft artillery and in as many of the other classes of artillery as may be practicable.

In support of this argument, the following statistics have been compiled from the reports of target practice held in the Coast Artillery Corps during the years 1925, 1926, 1927, and 1928. In these four years two hundred and twenty-one officers fired some form of target practice. There is a total of six hundred and sixty-four officers (captains, 276; first lieutenants, 229; second lieutenants, 159) carried on the Coast Artillery list who should receive training in firing a battery. When it is noted that only one-third of our battery officers are given an opportunity to conduct target practice in a period of four years, the importance of an exchange of officers serving with batteries among the different classes of artillery becomes at once apparent.

The following percentages are based upon the two hundred and twenty-one officers who fired practices in the past four years:

a. Percentage of officers who have conducted an antiaircraft target practice and also a seacoast (railway, tractor, mines, fixed) practice: 8.6 (19 officers).

b. Percentage of officers who have conducted an antiaircraft target practice: 30.8 (68 officers).

c. Percentage of officers who have conducted a target practice with both tractor and seacoast (railway, mines, fixed) artillery: 8.1 (18 officers).

d. Percentage of officers who have conducted a target practice with tractor artillery: 21.7 (48 officers).

e. Percentage of officers who have conducted a target practice with railway artillery: 8.6 (19 officers).

f. Percentage of officers who have conducted a mine practice: 11.3 (25 officers).

g. Percentage of officers who have conducted a target practice with fixed seacoast armament: 52.4 (116 officers).

h. Total number of organizations having target practice with water targets: 73; total number having target practice with air targets: 31. It should be noted that in four years 68 of the 221 officers who fired a target practice had a practice with antiaircraft artillery, and during this time only 19 out of the 221 had both antiaircraft and seacoast training.

Recent instructions sent to the overseas departments directs the training of officers in more than one class of artillery whenever practicable. There, with the close grouping of antiaircraft and other artillery, it is frequently possible to change the assignment of an officer without expense to himself or to the government. In the continental United States, however, it is more difficult to work out a reasonable plan of exchange which does not involve too frequent changes of stations.

The small number of officers on duty with batteries, the demands for officers for duty away from troops, and the length of normal tours of duty make it improbable that any scheme can be evolved to assure training of battery officers in all classes of artillery. A minimum requirement would seem to involve training in antiaircraft artillery and one other class, as railway, tractor, or fixed. The pressing need—present and future—is for officers trained in the technique of antiaircraft artillery. Officers who have not had such training should anticipate the future by requesting antiaircraft assignment on their preference cards. By so doing they will assist in the scheme of rotation and will prepare themselves for assignment to one of the most important duties of the next war.

A New Editor

With the appearance of this issue of the COAST ARTILLERY JOURNAL, the present editor brings to a close his four-year period at the editorial desk and surrenders the editorial pen. The regret which he feels at leaving a most interesting duty is tempered by the pleasure he takes in being able to announce that the destinies of the JOURNAL are to be placed in the capable hands of Major Stewart S. Giffin, who is too well and favorably known to the Coast Artillery Corps to require an introduction.

Major Giffin brings to the JOURNAL an incisive and facile pen and a talent which has been developed by a varied experience. He is a recent graduate of the Advanced Course of the Coast Artillery School and of the Command and General Staff School. His more recent duties with the Organized Reserves has given him a sympathetic understanding of the needs of that component of our service which will go far toward enabling him to meet those needs.

We have no doubts for the success of the JOURNAL under his direction, and we bespeak for him a generous support from the members of the Coast Artillery Corps. The duties of an editor, like those of any other position whereof the success is a question of voluntary cooperation on the part of others, may be

come thankless duties. An editor alone cannot produce a periodical; he only selects and arranges his material. To produce a magazine of real value and interest, two things are required: contributors and readers. It has been remarked before in these pages that practically every officer in the Corps has had some experience, has devised some method or apparatus, or has investigated some subject which would be of interest to others. Were these experiences, designs, or investigations to be written up and submitted, the character of the JOURNAL, through selection and publication of the most interesting and elimination of the least interesting, would be so greatly improved that the questions of subscribers would cease to be a question. Under new conditions, in new surroundings, and with the support of the Corps, the JOURNAL will, we trust, flourish as never before.

Great powers, well armed and having a vivid sense of opportunity, supported by popular clamor for the vindication of national interest, are disposed to seize what they believe to be within their grasp. Resistance by force means war. . . . Thirty-five years ago the most distinguished of publicists found some promise of peace in the alliance of the three emperors and in the consequent isolation and agreement for peaceful adjustment of a limited group of questions which otherwise might lead to conflict. But time has shown how illusory are alliances of great powers so far as the maintenance of peace is concerned.—Secretary of State Charles Evans Hughes.

PROFESSIONAL NOTES

Commissioned Personnel, Office Chief of Coast Artillery

Chief of Coast Artillery

MAJOR GENERAL ANDREW HERO, JR.

Executive

MAJOR HENRY T. BURGIN

Organization and Training Section

COLONEL H. L. STEELE

LT. COL. W. S. BOWEN (relieved 6/29)

MAJOR J. H. COCHRAN (not yet joined)

CAPTAIN J. H. WILSON

Plans, Finance, and Materiel Section

MAJOR O. L. SPILLER (relieved 6/29)

MAJOR C. H. TENNEY

MAJOR J. B. CRAWFORD (not yet joined)

CAPTAIN F. J. MCSHERRY

Gunnery

MAJOR S. JARMAN

Personnel Section

MAJOR H. T. BURGIN

CAPTAIN H. N. HERRICK

Intelligence Section

MAJOR ROBERT ARTHUR (relieved 6/29)

MAJOR S. S. GIFFIN (not yet joined)

CAPTAIN H. N. HERRICK

Service Club House

The Women's Army and Navy League has established a Service Club House for enlisted men of the Army, Navy, and Marine Corps, at 1015 L Street, N. W., Washington, D. C. This club, situated in the heart of the city and within easy reach of Union Station, Capitol, Library of Congress, Government offices, theaters, and business section of Washington, provides sleeping rooms, well equipped bath rooms, showers, meals, and wholesome recreation for our service men.

Since the cost of the establishment and the upkeep of this club have been and will continue to be met by those having the interests of our enlisted men at heart, the services of the club will be provided to soldiers, sailors, and marines at merely nominal prices.

The club house is a large attractive and spacious building, fronting on L Street and Massachusetts Avenue and also on 11th Street, which street has a car line.

Enlisted men of the Army, Navy, and Marine Corps, visiting Washington either on official business or on personal matters, will find a clean, attractive, and convenient home during their stay in the city, where they will not only receive courteous attention but where they will be in environment to which they are accustomed.

This club house not only fills a long-felt need but is a distinct credit to the service.

The above information is furnished to the end that all enlisted men, temporarily in Washington, may be acquainted with the facilities which have been made available for their comfort and convenience under the kind auspices of the Women's Army and Navy League.

The JOURNAL has been informed that the privileges and services of the Club House will likewise be granted to members of the Coast Guard and trainees at Summer Camps.

A Criticism of Criticisms

A writer over the signature "178" gives an expression of his views on this subject in the March 25 number of the *Militär-Wochenblatt* which, taken in connection with the editor's comments on his contribution, are well worthy of notice. The writer's views are, in substance, as follows.

Criticism is the essential element of military literatures and is based on the fact that the art of war is a science and criticism is necessary for the development of every science. Intolerance of or impatience with criticism is an infallible sign of the beginning of obsolescence and of calcination. We find, however, when looking over our military journals, contributions that are not wholly free from objections in their methods of criticism. We are today in the era of an enormous literary activity. Many officers take in hand a criticizing pen to announce points of view on matters that seem amiss to them generally and frequently in caustic language. Criticisms coming from the ranks of the younger are a welcome manifestation of something better than disinterestedness, but the young man, passing judgment on that which seems to him old and outworn, fails to remember that in a very few years he will also be classed with the elders. But the asperity of youthful criticism would not be so acutely felt if it avoided trivialities and confined itself to greater and more important issues than are usually brought out. I mean by this that there is a tendency in our present military literature to dwell on subjects that approximate those of the after Frederician period as, for example, where an officer writing about a drill regulation that fixed the marching tempo at seventy-five steps per minute remarked: "After mature thought and much observation I have reached the conclusion that sixty-seven steps per minute are much better," and proceeded to strengthen his point with an elaborate argument. While we may look with an indulgent smile upon such examples it may not be out of place to consider, when examining some of the military literature now being published, whether we may not be reverting to era of elaborate discussions of the trousers buttons and knapsack straps. The younger generation is turning its attention to minor inner service matters. May we not consider whether in their criticisms on some of those subjects the writers are not fully justified in endeavoring to pass judgment on the question at issue for want of that most essential qualification—experience? A lieutenant may, for example, be more competent to write interestingly about mobilization than about the expediency of the Sunday furlough for recruits and let his captain worry about the latter. Would it not be well for the generation of today, which is so earnestly striving for clarity and reality, to admit the old truth that even good human common sense cannot wholly take the place of experience?

The young officer would do well to refrain from fault-finding criticism of an ill-fated field-service exercise and direct his attention to the great problems of today and tomorrow upon which he can, aided by his youthful want of burdensome prepossession of ideas, exercise his critical faculties with an unimpeded clearness of spirit and thought. The young officer should write over his "thoughts about the future" as a heading the monition: "Reports concerning future experiences are left to the elders."

* * * * *

The comments of the editor of the *Militär-Wochenblatt*, General von Altrock, on the article of which the foregoing is a condensed synopsis, are:

"We gave room to this writer because we did not desire to stand in the way of criticism even when it is a criticism of criticism. Criticism is treated in many different ways in different armies. In France there prevails a happy and distinct freedom of expression concerning military matters, even in regard to those pertaining to existing service regulations. Those were very materially influenced in their origin and formation by criticism. This applies especially to their excellent artillery regulations which were the subject of much criticism by artillery officers and especially of captains of artillery. An equal freedom of criticism prevails in England. The important lectures of the United Service Institute are

in fact published with the criticisms of them which are frequently more informative than the lectures themselves. In the U. S. A. military criticism moves in channels which are wholly unimpeded, as is shown by numerous examples.

"In the old Prussia criticism was officially disrelished. Read in Clausewitz's *Catastrophy of 1806* where he sets forth that every view opposed to existing conditions was openly declared as 'pessimistic' and was suppressed. Read Scharnhorst's complaints on this subject. One may recall that before the World War pessimists were not to be endured in the State. Were they pessimists? Were they not, perhaps, the voices of warning uttered from a conscientious sense of duty by men who had a better insight into that which was to come than was possessed by the mass of the population and by the greater portion of those in positions of authority in the State? It is the same with us Germans today, when fate is on our necks. Beware of awakening unrest! Do not awaken him who has happy dreams! That waking up may find us being submerged is a *cura posterior*. *Caveant consules*.

"These reflections are addressed to the entire press, including military journals. But military knowledge and capacity includes highest, high, and medium problems. Of the last named the great Frederick says: 'Take care of details they also have their merits today.' One must not regard them as insignificant and deny them criticism. Youth practices on them in its ascent to higher aims. Let us not press down too hard on the safety valve of youthful steam power. Reflections on 'the workshop of the squad' or about 'maneuvers' are, as fully entitled to notice as are those about strategic and high tactical problems, for example. For this reason the editorial management of this journal will be delighted when the young officer, taking pen in hand for practice on minor affairs, rises to spiritual heights."—G. R.

Military Preparation of Italian Youths

The *Militär-Wochenblatt* of February 25, 1929, quoting from the Italian journal *Esercito e Nazione* for January, 1929, publishes the following on measures taken by the Italian government to prepare and train youths for the military service of the nation and incidentally to improve the younger generation physically and culturally.

The organization is called Opera Nazionale Balilla and General Renato Ricci stands at its head. It has been in existence about three years and owes its origin to Mussolini's own personal efforts. The Balilla has its local groups in every city and its members in every village. The training is in the hands of the active militia officers.

Composition: eleven members form a *quadra* (corporal's command); three *quadras*, a *manipel* (section or platoon); 3 platoons, a *centurie* (company); 3 centuries, a *cohort* (battalion); 3 or more cohorts, a *legion* (regiment). The total strength of these youthful regiments, which is continually increasing, is at present 1,119,526. Distribution according to age is: *avant guardisti*, ages from 8 to 14 years; and the real *batilla*—the youthful defensive force—from 14 to 18 years. There is a distinction in the training of these organizations for army and navy service. There are the following subdivisions of groups within the legion: the ski runners, the machine-gun and antiaircraft riflemen, the flyers, and other specialists. The naval legions are engaged principally with sailing and bridge-building exercises. The naval legions are especially well organized and are admitted by Turati to be standards of excellence. "The future of Italy is in the seas that were once upon a time traversed by the glorious Roman triremes."

The ski runners have their fields of activity naturally in the extended Alpine regions of upper Italy. The first legion has its base in Rome. Bozen, Trentino, and Meran are special *points d'appui*.

The machine-gun and antiaircraft riflemen comprise about 3000 youths distributed over 18 antiaircraft circuits. They are attached to the antiaircraft inspection organizations of the army and receive theoretical and practical training in antiaircraft gun and machine gun exercises.

The flyers are trained in annual courses of groups of 100 youths. Flying officers and technical civilian instructors lead these courses

Composition of the usual legion: Every legion has one cohort composed of specialists. The ordinary cohort is made up of centuries of signal men, bicyclists, visual signalists, radio telephonists. There are, in addition, special intelligence centuries, with signal men and motor cyclists. There is with each legion a technical section with builders of water supply works, huts, and barracks. This training takes place twice each year and on Sundays.

But the principal training season is in Summer when the legion is assembled in camp and its time is taken up wholly with military exercises, excursions, travel, sports of all kinds. Five thousand youths took the camp course in 1928. Every province has its own camp arranged for a twenty-day period. There are, in addition, so called "week-end camps" which are available from Saturday evening to Monday morning to young men employed during the week. The youths' defense training has also been introduced in the colonies. More than 1000 were in training in Lybia in 1927 and as many more in the Eastern port cities of the Mediterranean.

The balilla has for its purpose, aside from military preparation, caring for the promotion of education and fostering the culture of the youths under its control. This is greatly enhanced by general training and progressive educational and vocational instruction of all kinds and aided also by extended systems of financial assistance to needy individual cases. Balilla has its own press.

The youths are taking part in this movement with great enthusiasm and exercise disciplinary control in manliness and deportment over their membership. They wear a distinctive uniform. The whole organization is an admirable and powerful instrument of progress, owing its origin to the gifted genius of Mussolini.

The German writer adds to all this the remark: "*And where is Germany?*"—G. R.

An Austrian Estimate of the Russian Grand Duke Nicholas

The *Oesterreiche Wehrzeitung* of January 11, 1929, has this to say of the late Russian grand duke: A few days ago the former generalissimo of the Russian army died at Antibes in Southern France at the age of 72 years. With his decease one of the most distinguished leaders of the World War passed away.

Nikolai Nikolajewich, son of the same-named field commander of the Balkan wars of 1876-1877, distinguished himself as a young officer of the Shipka Pass campaign. He was a brilliant, soldierly figure of remarkable size and bodily strength, inspired with his vocation as a soldier, of strong will power and reckless to the verge of brutality. As ardently as he loved Russia did he, as leader for a long time of the Russian war party, hate everything German, including Austria-Hungary. When Russia was finally steering more and more toward war it was the work of the grand duke to overcome, after a long period of resistance, his nephew the Czar and induce him to yield.

Nothing in the way of criticism can certainly be said against the plan with which the grand duke, as generalissimo, went into the field at the head of the Russian millions in 1914. Either the Gallician and the East Prussian bastion, at least one of the two, had to be overcome before one could comply with France's desire for an advance in the direction of Berlin. The fact that success with that plan was not forthcoming was due to the power of resistance of the opponent, but also no less to the peculiarity of the Russian army whose unwieldiness a man of the energy of the grand duke was unable to overcome. It is sufficient, with respect to this feature, to read the memoirs of Daniloff, who worked in the direct environment of the grand duke field commander and can be counted on as a reliable witness of the first rank. The grand duke endeavored in vain, until well into the Spring of 1915, to eradicate from his generals the feeling of timidity that had gained possession of them after Tannenberg, against entering upon German soil. And when he finally yielded to Ivanow's pressure it was six months too late. In the meantime, the shortness of supplies

of ammunition and of arms began to jolt the structure of the army and even the certainly great force of the grand duke was unable to resist the influence of the slow jog trot routine of the administrative system and of the corruption that was beginning to pervade well up into the highest branches of the life of the state.

Gorlice began to undermine the standing of the commander in the field. Even though the grand duke again and again succeeded in withdrawing the whole Russian army or certain material parts of it from threatened disaster, the fatality of defeat had begun to impair his prestige as commander. In the beginning of September, 1915, the Czar took over the command of the army in his own person and the grand duke was given the command in the Caucasus. A renowned French military writer sees in this transfer of the grand duke the real beginning of Russian misfortune.

When the revolution broke out, various Russian military circles hoped to achieve through Nikolai Nikolaijevich the restoration of the fatherland. But in this they were disappointed, although the grand duke played an important rôle in the ranks of the Russian emigrants after his flight to foreign lands. Death has, in him, taken from the world a man who was once arrayed as one of our most dangerous enemies but one whose weight in the scale of history we cannot question.—G. R.

Military Training of Women in Poland

The *Militär-Wochenblatt* of February 18, 1929, contains an article on this subject from which the following extract is here given. The training began several years ago and is largely due to the propaganda that is being continually fostered in Poland that it would be of great importance in the future war that Poland anticipates and intends to be prepared for. The entire training course is divided into three periods through which every woman offering herself voluntarily must pass in order to be available for military service in war. The first period includes promotion of physical fitness and adaptability. Every woman who passes this course receives an official distinctive sport badge from the state. The second period embraces the so called general military training. It consists of educational work as well as of acquisition of general military knowledge. Lecturers furnish the hearers with a general representation of army organization, of the duties and of the inner life of the army and endeavor at the same time to impress each woman with the army spirit in its military sense. In these lectures anti-gas and anti-flyer defense is also treated of and the handling of all kinds of war weapons is worked out. In the third and most important period special training of women in the different branches of the military service is taken up. This covers various courses as, for example, sanitary, telegraphic communication, reconnaissance, subsistence supplies, and replacements. This course is participated in by women who have offered themselves for special service in the army in case of war. Completion of the three training courses provides the women taking them with the possibility of taking a suitable place in the military service in war.

The state, of course, provides all the facilities for the training and ample provision is made for carrying out its details and rendering to each organization the necessary assistance such as providing implements and weapons for military exercises, exercise grounds and firing fields, etc.—G. R.

Foreign Periodicals

Revue d'Artillerie, March, 1929

WARS OF THE FIRST EMPIRE (Continued). By Colonel A. Grouard.

TOXIC PROJECTILES IN 1650. By Colonel Apffel.

CONTRIBUTIONS TO THE STUDY OF THE WAR OF 1914-1918. By Lieut. Col. L. Menu.

PRACTICAL CALCULATION OF THE DISPERSION OF FUZED FIRE. By Commandant Camps.

ANTITANK FIRE BY ISOLATED PIECE. By Captain Ragonnet.

The Army, Navy and Air Force Gazette, April 18, 1929

THE THEORY AND PRACTICE OF WAR.

A NEW EXPERIMENTAL ARMoured FORCE. By Colonel H. Rowan-Robinson, C. M. G., D. S. O., p. s. c.

The Journal of the Royal Artillery, April, 1929

CURRENT NAVAL PROBLEMS. By Captain B. H. Ramsay, M. V. O.

EIGHTH AUGUST, 1918. By Lieut. Gen. Sir Archibald Montgomery-Massingberd, K. C. B., K. C. M. G.

BATTERY TACTICAL TRAINING. By Bt. Lieut. Col. E. C. Anstey, D. S. O., p. s. c.

DOES RADIO TELEPHONY OFFER A POSSIBLE SOLUTION TO THE MAIN ARTILLERY PROBLEM OF TODAY? By Captain C. W. Holden, D. S. O., M. C.

WEAPONS. THE INTERDEPENDENCE OF POLICY, STRATEGY, AND TACTICS, WITH THEIR DESIGN, FINANCE, AND PROVISION. PART I. By Captain C. T. Beckett, M. C.

THE TRANSJORDAN FRONTIER FORCE. By Captain L. C. Lockhart, M. B. E., M. C.

L'ECOLE SUPERIEURE DE GUERRE. By "Commentdone?"

HOW TO WRITE A DESCRIPTION OF A BATTLE. By Colonel Grasset. Translated by Brig. Gen. W. Evans, C. M. G., D. S. O.

THE CARAVAN ROAD TO SINKIANG. By Lieut. Col. G. K. Gregson, D. S. O.

RACING IN INDIA. By Major F. H. Richards, D. S. O.

Engineering, April 12, 1929

TORPEDO BOAT DESTROYERS FOR THE CHILEAN NAVY.

The Army, Navy and Air Force Gazette, April 11, 1929

THE EMPLOYMENT OF A LIGHT ARMORED FORCE. By Major G. Le Q. Martel.

Canadian Defence Quarterly, April, 1929

CIVIL AVIATION IN CANADA, 1928. By J. A. Wilson.

A CAVALRY ENCOUNTER. By Captain W. W. Murray.

WITH COASTAL MOTOR BOATS IN NORTH RUSSIA. By the late Lieutenant Commander Cecil C. Dickinson.

ANTI-AIRCRAFT. By Lieut. Col. T. C. Newton.

A BRIEF HISTORY OF INFANTRY TACTICS. By Major M. K. Greene.

MECHANIZATION. By Major L. C. Goodeve.

THE CANADIAN MILITIA: THE FENIAN RAIDS. By Colonel C. F. Hamilton.

MEDICAL NOTES ON BURGOYNE'S CAMPAIGN, 1776-77. By Major R. M. Gorssline.

SOME COMMENTS ON RELATIONS BETWEEN THE SERVICES. By "Optimist."

A SHORT HISTORY OF THE MANITOBA DRAGOONS. By Lieut. Col. H. A. Croll.

NATIONAL POLICY AND NAVAL STRENGTH. A REVIEW.

The Army, Navy and Air Force Gazette, April 4, 1929

THE INFANCY OF THE NEW ARMY.

FURTHER ASPECTS OF MECHANIZATION. By Colonel H. Rowan-Robinson, C. M. G., D. S. O., p. s. c.

Vojensko-Technické Zprávy, March, 1929

DEJINY BALISTIKY DO KONCE XVIII STOLETÍ By Pplk. Jan Gebauer.

PRÍSPĚVEK K PROBLÉMU ZVUKOMERICKÉMU. By Ing. Josef Langr.

ZENIJNI SLUŽBAV USA VE VALCE. By Pplk. J. Zuzka.

POKUSY S THERMITEM K ODSTRANOVÁNÍ LEDOVÝCH ZÁCP. By Kpt. J. Souhrada—Kpt. Ing. Bülov.

The Army, Navy and Air Force Gazette, March 7, 1929

BONAPARTE AND MECHANISED WAR. By B. H. Liddell Hart.

The Army, Navy and Air Force Gazette, March 14, 1929

BONAPARTE AND MECHANISED WAR. By B. H. Liddell Hart.

The Army, Navy and Air Force Gazette, March 21, 1929

FURTHER ASPECTS OF MECHANISATION. By Colonel H. Rowan-Robinson, C. M. G., D. S. O., p. s. c.

The Army, Navy and Air Force Gazette, March 28, 1929

MARSHAL FOCH.

FURTHER ASPECTS OF MECHANISATION. By Colonel H. Rowan-Robinson, C. M. G., D. S. O., p. s. c.

Memorial de Artilleria, March, 1929

MECHANIZATION IN MODERN ARMIES. By Captain Francisco Marinas.

THE FIRE OF ARTILLERY IN DEFENSE AGAINST AIRCRAFT. By Antonio Juliani y Calleja.
ANTI-AERONAUTICS (Continued). By Commandante V. Balbás.

Revista de Artilharia, March, 1929

MISSAO DE ARTILHARIA JUNTO DAS TROPAS INGLESAS. By Lieut. Col. Bernardo de Faria.

A TEORIA DO UNIVERSO. By Lieut. Col. A. J. Bernardes de Miranda.

TRABALHOS PRATICOS NAS UNIDADES DE ARTILHARIA. By Major J. da Silva Dias.

Revista del Circulo Militar, February, 1929

QUALITIES BY WHICH THE MODERN OFFICER CAN FULFILL HIS MISSION IN THE ARMY. By General Amando Llanos C.

THE ORGANIZATION OF A BATTALION DEFENSIVE SECTOR. By Colonel Hernán Puelma.

MILITARY CONFERENCES AND THEIR IMPORTANCE. By General Teodora S. Avila.

Orgaan der Vereeniging ter beoefening van de Krijgswetenschap

DE LEIDING VAN DEN OORLOG. By Maj. Gen. P. J. van Munnekrede.

The Royal Engineers Journal, March, 1929

AIRSHIP DEVELOPMENT. By Group Captain P. F. M. Fellowes, D. S. O., A. D. C.

THE ARMoured FORCE. By Brigadier R. J. Collins, C. M. G., D. S. O., p. s. c.

PALESTINE. By Field Marshal The Viscount Allenby, G. C. B., G. C. M. G., D. C. L., LL. D.

THE "MECHANIZATION" OF FLEETS AND ARMIES. By V. W. Germaines.

BOOK REVIEWS

Textbook of Ordnance and Gunnery. By Earl McFarland, Professor of Ordnance and Gunnery. New York: John Wiley & Sons, Inc. 1929. 5 $\frac{3}{4}$ " x 8". 625 p. Il. \$6.50.

Without a doubt Colonel McFarland has filled a timely need. The advances in ordnance manufacture and ballistic methods during the past decade have rendered obsolescent many other excellent treatises dealing with the subjects of ordnance and gunnery. All military men will welcome this new book. Its value will accrue not only to those of the Regular service, but to all officers of the National Guard and Organized Reserves, whatever their branch.

A most noticeable feature of this book is the balance which exists between the theoretical and the practical. This is as it should be. The theoretical ballisticians cannot long succeed without proving-ground justification for his interesting integrations. At the same time it must not be denied that the underlying sciences applying to gun and projectile design are worthy of a great deal of study and investigation. Colonel McFarland has included within his pages clearcut explanations of the applications of mechanics, physics, and chemistry to ordnance problems. At the same time, it is noted that his examples and exercises are based upon actual situations encountered in the arsenal and at the proving ground.

This method of attack is clearly demonstrated in his chapter on Explosives. He begins with a presentation of the fourfold characteristics of the effective explosive. His treatment of the subject of Work is very clear. From this first position he leads directly to a discussion of the fundamental laws of the thermodynamics of gases. The chapter closes with a summary of principles involved by applying them to the actual case of nitroglycerine reaction.

Turning to the discussion of interior ballistics, we note that the author has chosen to approach the subject by way of Le Duc's equations. It is believed that, for approximate results and also for a sufficient understanding of this subject, these equations are satisfactory. They are quite accurate, and whatever small errors might be involved are not in the direction of danger. One who has ever studied the more rigorous solutions of Colonel Tschappat will not wish to slight them in the least; but for the average officer they are most too formidable, and the calculations as demonstrated by Le Duc answer nearly all demands. The designer would undoubtedly resort to Tschappat's equations for final stresses. A further interesting feature of Colonel McFarland's work is a discussion of variations from standard conditions. This is quite important for the artilleryman, and the presentation which is given in this book covers such matters as changes in density of loading, changes in weight of projectile, erosion in the bore, and changes in temperature and moisture. All of these are problems often encountered, and an understanding of their effects is essential.

Of equal interest is the chapter on exterior ballistics. Siacci's method is the nearest that Colonel McFarland approaches to any of the classical aspects of this subject. The greater portion of his discussion is devoted to an explanation of the work of Dr. Moulton and his associates in the application of "short-arc" or numerical integration to the problem of the trajectory. To the average person, mere mention of this method of integration is likely to result in a feeling that it is something entirely too tedious for consideration. Truly, it does require concentration and accuracy for its application, but the method has opened up new fields of knowledge concerning the behavior of a projectile. The recent advances in exterior ballistics are due in part to this method of calculation, and its importance must not be minimized. Colonel McFarland has encompassed in just a few pages a very clear and direct explanation of this method.

These are just some of the interesting features of this text. To treat of all its excellent points would require more space than could possibly be allotted. There is a description of the various instruments employed at the proving ground, even to the solenoid chronograph. The chapter on metals used in ordnance construction goes into the question of radiographic examination of steels. There is a treatment of non-ferrous alloys. The various types of artillery, both mobile and fixed, heavy and light, are thoroughly described. There is ample information concerning fire-control instruments. The use of tables in firing is explained in detail. The types of motorized materiel are given thorough attention.

The appendix should not be overlooked. It contains a table of the chronological development of ordnance materiel. In addition to the usual tables in any technical book, there is a summary of the report of the Westervelt Board and a description of the German long-range gun.

The author has shown keen judgment in arranging the material in his book. It is especially noticed that in his discussion of motorization and other present day topics of ordnance progress, there is no tendency to include matters that are controversial. We must conclude that here is an officer who is worthy of his hire.—G. B. D.

Sound Off. Compiled by Edward A. Dolph. New York: Cosmopolitan Book Corporation. 1929. 7½"x 10¼". 621 p. \$7.50.

Lieutenant Dolph has been engaged for many years in collecting the songs that have been popular in the Army, and this collection shows the result of great patience and much labor. Originally intended to include only the songs written and sung within the Army, the collection was extended to include military songs not written within the Army but adopted (and perhaps adapted) by the Army for its own. More than three hundred songs are included and these are arranged in sections that include the songs of today and of the World War, the Mexican War, the War of 1812, and the Revolutionary War. The final sections consist of selected songs from the regiments and from West Point—where many songs have been made. Many of the songs are prefaced by an account of their origin or by anecdotes connected with them. Many more are followed by parodies that have been popular.

Practically nothing has been omitted, if printable. Even the ribald Lulu has been included, although Lieutenant Dolph found himself unable to continue the words beyond the second line of the first verse. The music was arranged by Lieutenant Philip Egner, teacher of music at the Military Academy, and the sketches illustrating the volume were drawn by Lieutenant Lawrence Schick, of the Department of Drawing.

Lieutenant Dolph says: "In compiling this book, I have been prompted by two motives: first, to preserve such soldier songs as are now extant and to resurrect as many of the forgotten ones as I could find; and second, to give to the army and veterans' organizations a singable collection of soldier songs." He has succeeded remarkably well and the publishers have turned his collection out in excellent form. Song is a builder of morale, and every officer is interested in morale. Ergo, every officer should be interested in and should possess this valuable book of songs.

Lafayette in Virginia. Edited by Gilbert Chinard. Baltimore: Johns Hopkins Press. 1928. 7½"x 10¼". 64 p. \$2.50.

When Major General the Marquis de Lafayette was sent to Virginia with a small detachment of Continental troops to check the British threat in that quarter, he was called a "boy" by the veteran Cornwallis, who had also proceeded to Virginia. Lafayette celebrated his twenty-fourth birthday during the siege of Yorktown, yet it is probable that no other American general officer could have conducted the Virginia campaign of 1781 with greater circumspection nor with greater success. Possessing the confidence, friendship, and trust of Washington, commanding in the North, and of Greene, commanding in the South,

Lafayette exercised what amounted to an independent command in Virginia under conditions in which he could very easily have made serious mistakes. That he made none was enough to silence any criticism of his selection by Washington for this important post.

In such of Lafayette's correspondence as has been published, his desire to win approbation and his extreme care to conciliate everybody is particularly to be noted. Lacking horses, he used oxen. Without clothing for the men, he pledged his own fortune. Tactfully urging State and Continental authorities, he secured what he could and prosecuted his campaign with vigor and success.

Much of the reason for his popularity and his success as a commander in the field may be seen in these hitherto unpublished letters which have been brought together by the Institut Français de Washington from the Virginia State Library and the Library of Congress. No narrative accompanies the letters, which were for the greater part written to Governor Jefferson, Governor Nelson, Patrick Henry, General Wayne, and Colonel Davis between February and October, 1781, but the letters themselves express Lafayette better than any narrative could.

The editor has been careful to retain the exact spelling and punctuation of Lafayette and even reproduces one letter in the chirography of the famous Frenchman. In publishing these letters the Institut Français de Washington has, to use the words of the editor, made "an important addition to the wealth of material already obtainable on the last year of the Revolutionary War."

L'Enfant and Washington, 1791-1792. By Elizabeth S. Kite. Baltimore: The Johns Hopkins Press. 1929. 7½"x 10¼". 182 p. Il. \$3.00.

Pierre Charles L'Enfant is best known to the military service as an Army engineer who was employed at Fort Mifflin and elsewhere in the first coast defense project of the United States—that of 1792-1794. He had come to this country from France in 1777 as a volunteer and was commissioned the following year as a captain of engineers in the Continental Army. He served at Charleston and with the army in the south, reaching the grade of major before the end of the war.

L'Enfant, artist as well as engineer, was intensely stirred by the idea of designing a city when the site of Washington was selected as the National Capitol and he secured his own appointment for that purpose. He laid out the plans of the city, located the Capitol and the White House and all the many features which he felt the seat of government should possess. He was, however, high-handed and difficult to work with. He would take no orders from the Commissioners and insisted on his own schemes in every detail. He was finally removed, but not before he had completed the essential parts of his plans. The City of Washington as laid out was the city of Washington as designed by L'Enfant; and the Washington of today is a monument to the foresight which enabled him to visualize a completed city on the vacant fields with which the project started.

The name of L'Enfant has probably not been sufficiently associated with Washington; but when, more than a hundred years after L'Enfant had drawn up his plans, a Commission of artists was appointed to lay out the District of Columbia (as L'Enfant had laid out a part) the L'Enfant plan was readopted and applied to the entire District. It is to be hoped that the author of the plan will hereafter receive greater credit for his work.

The present book was prepared to show just what part L'Enfant played in designing the city. The work consists mainly of the original correspondence, connected by sufficient narrative to give the whole work a continuity which keeps the reader oriented at all times. The work is brought out under the auspices of the Institut Français de Washington, which was incorporated in 1926 for the purpose of promoting in the United States the study of French civilization, history, literature, and art and of preserving the memory of French contributions to the development of American civilization by publishing documents and other-

wise. In this, the third book published by the Institut, many published and unpublished documents are brought together for the first time, and the interest resulting from their association is enhanced by an Introduction by J. J. Jusserand, formerly ambassador of France to the United States, and a foreword by Charles Moore, Chairman of the National Commission of Fine Arts.

An Outline History of the Great War. Compiled by G. V. Carey and H. S. Scott. London: Cambridge University Press. 1928. 5½"x 7½". 279 p. II. Maps. 6 Shillings.

When one takes a moment to count up the years that have elapsed since the close of the World War, one discovers with a bit of surprise that the young men who are now graduating from college can have no first-hand knowledge of the war and its effects. Even the oldest of them can scarcely remember the outbreak of war in 1914. Of those of us who participated, a few may still be considered young, but it will not be long before affairs will be dominated by men who had no part in the war. It will be well if they have some knowledge of the war—particularly of war atmosphere, of what men felt and endured and did.

With somewhat of this thought in mind, Major Carey and Captain Scott have prepared an outline of the war in which the utmost compression has been exercised. The narrative is restricted almost entirely to the British campaigns and battles, and in these only the main events are discussed. The result is a brief but clear exposition of the course of the war, one which does not take long to read. Sketches show the different areas in sufficient detail to enable the reader to follow the text intelligently, and each chapter closes with a list of three or four books for further reading on the subject matter of the particular chapter.

The book will serve its purpose. To the military student, its particular value will lie in the possibility of general orientation which it affords preliminary to further and more detailed study.

A Saga of the Sword. By F. Britten Austin. New York: The Macmillan Company. 1929. 5"x 7½". 322 p. \$2.50.

Masonry claims for itself rank as the most ancient of professions, but the military profession can dispute the claim with some reasonable arguments. Both started from small beginnings and the origins of both are obscure. Mr. Austin, in his saga, goes back to the neolithic ages to discover the period at which "war came to the world." From this, as a starting point, he traces the development of warfare in a series of episodes which, disconnected as a tale, possess a thread of continuity in that each marks the end of one era in warfare and the beginning of a new. The victory of Alexander over Darius, the destruction of Carthage, the passing of the legion, the spread of Islam, the first Crusade, the introduction of cannon, Gustavus Adolphus, and Napoleon furnish the background for some of the tales and bring the profession of arms up to modern times. The World War brings warfare to the end of one epoch—that of man against man—and introduces that of machine against machine.

Mr. Austin possesses the faculty of vivid and concise writing. No extraneous matter mars the development of his theme and in the end we are left with a clear outline picture of the development of warfare.

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